INTERIM DRAFT TREATMENT PLAN

PHASE IV
TANAPAG VILLAGE, ISLAND OF SAIPAN
COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS

Prepared for:

Environmental/DoD Support Branch
United States Army Corps of Engineers
Honolulu Engineer District
Building 230
Fort Shafter, Hawaii 96858-5440

INTERIM DRAFT
TREATMENT PLAN

Phase IV
Tanapag Village, Island Of Saipan
Commonwealth of the Northern Mariana Islands

May 2001

I hereby certify that the enclosed Treatment Plan, shown and marked in this submittal, is proposed to be incorporated with Contract Number DACW62-00-D-0001, Delivery Order 0002, for Phase IV, Tanapag Village, Island of Saipan, Commonwealth Of The Northern Mariana Islands. This Treatment Plan complies with contract specifications and OSHA requirements, and is submitted for Government approval.

Reviewed by:

____
Project Manager Date

____
Project Engineer Date

____
Quality Control Systems Manager Date

Accepted as a submittal:

____
USACE Contracting Officer Date

INTERIM DRAFT
TREATMENT PLAN

Phase IV
Tanapag Village, Island Of Saipan
Commonwealth Of The Northern Mariana Islands

Prepared for:

Environmental/DoD Support Branch
United States Army Corps of Engineers
Honolulu Engineer District
Building 230
Fort Shafter, Hawaii 96858-5440

Contract No. DACW62-00-D-0001
Delivery Order 0002

May 2001

Environmental Chemical Corporation
99-1151 Iwaena Street
Aiea, HI 96701

TABLE OF CONTENTS

ATTACHMENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

LIST OF ACRONYMS AND ABBREVIATIONS

CO	Contracting Officer
COR	Contracting Officer Representative
ECC	Environmental Chemical Corporation
ITD	Indirect Thermal Desorption
PM	Project Manager
RCRA	Resource Conservation and Recovery Act
SSHO	Site Safety Officer
TSCA	Toxic Substance Control Act
TSD	Toxic Storage and Disposal
USACE	United States Army Corps of Engineers
USADEH	United States Army Engineer District, Honolulu
WP	Draft Work Plan
CRZ	Contaminated Reduction Zone

1.0 INTRODUCTION

This document presents the technical approach proposed by Environmental Chemical Corporation (ECC) for the Removal Action at Tanapag Village, on the Island of Saipan, Commonwealth of the Northern Mariana Islands, under Contract Number DACW62-00-D-0001, Delivery Order 0002. The treatment and disposal tasks of the Phase III Removal Action are designated as Phase IV work. This document is provided to support planning of the Phase IV work of the removal action.

The Draft Work Plan (WP) has been prepared in accordance with the requirements of the December 20, 2000 RCRA Section 7003 Unilateral Administrative Order to the Department of Defense/Department of the Army to clean up polychlorinated biphenyl contamination in Tanapag Village, Saipan (RCRA 7003 Order). It is prepared for review and comment by USEPA, Region 9, and is subject to revision pursuant to USEPA comments.

Between August 2000 and April 2001, the Army excavated about 20,000 tons of contaminated soils in and around Tanapag Village, particularly at Cemetery II. These soils have been stockpiled and secured within eleven cells at the project site. The purpose of this WP is to address the manner in which these contaminated soils and debris will be treated to reduce the presence of PCBs in them to the action level of 1 part per million (1ppm) or less. Soils and debris that can not be treated to the action level will be removed.

The WP generally reflects the language at pages 7 - 9 of the RCRA 7003 Order which indicates that the Army will implement an indirect thermal desorption (ITD) process to remove the PCBs from the stockpiled soils and debris. The ITD process has been used successfully at other PCB cleanup projects and the Army presented a briefing of the ITD process to the CNMI DEQ and interested Tanapag residents in May of 2000. The Army is also preparing a focused feasibility study (FFS or study) of various alternatives for the treatment of PCB contaminated soil and debris, including but not limited to ITD. At the conclusion of this study, the Army will publish a proposed plan for the treatment of soil and debris at Tanapag for public review and comment. Public comment on this proposed plan will help the Army and the USEPA to refine and select the final treatment methodology. The Army expects to complete the FFS not later than June 15, 2001 and to publish the proposed plan for public comment shortly thereafter. The FFS is being prepared in accordance with the public participation requirements of the RCRA 7003 Order and 10 USC 2701, in a manner subject to and consistent with Section 120 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA).

This document presents the technical approach proposed by Environmental Chemical Corporation (ECC) for the Phase IV Treatment and Disposal tasks at Tanapag Village, on the Island of Saipan, Commonwealth of the Northern Mariana Islands, under Contract Number DACW62-00-D-0001, Delivery Order 0002. This document is provided to support planning and execution of the Phase IV work.

ECC Clean™ is an in-directly heated thermal desorption system (ITD), a class of low temperature thermal desorption system, for removing PCB contaminants from soil without combustion or burning. Indirect heating assures that burning of wastes does not occur. The desorption process heats the soil in a dryer and boils contaminants off soil particles rendering soil clean. The treated soil meets the residential reuse standard for fill. The contaminants in vapor form are removed from the dryer and are further refined to a small solid PCB waste stream. This waste can be safely shipped to a processing facility for disposal.

1. 1 Purpose

Use of ITD for PCBs is appropriate at sites that contain a moderate volume of waste, where the logistics of offsite disposal is cost prohibitive. The ITD process is a separation process that concentrates the waste to a small volume at high concentrations, thereby enhancing efficiency of subsequent treatment technologies and disposal. Disposal of the high concentrated wastes is addressed in other plans (attached).

Soils treated with ITD will be free of PCB and be available for unrestricted reuse (residential standards). The soils can be amended to support re-vegetation. Upon completion of the process the equipment and supplies will be removed and the site graded for reuse.

1. 2 Process Details

The key component to boiling the contaminants from the soil is a patented triple dryer. The dryer is a variable-speed rotary unit indirectly heated with a 30 MBTU/hr flame source (fuel oil for Saipan). Heat is transferred into two concentric cylindrical alloy chambers and to the exterior of the third cylinder. The triple dryer has demonstrated treatment rates in excess of 20 tons per hour. The design of the unit features enhanced heat transfer to optimize thermal efficiency. Discharge soil temperatures of 900 degrees F has demonstrated complete removal of PCB contamination from soil on similar sites. Bench testing of Tanapag soils has demonstrated complete removal of PCBs at temperatures below 900 degrees F. The dryer is maintained under vacuum in an inert (<4% Oxygen) atmosphere to assure no burning during the desorption phase.

Material feed systems consist of conventional feed screening plants and conveyors for soil preparation. Soil exiting the dryer passes through a double tipping valve, and is then conditioned with water in an auger. This conditioning reintroduces moisture into the soil for rehydration.

Vapors from the dryer consist of steam (water within the soil), contaminants and ine particulate matter. Air quality is preserved through treatment, separation and reuse, wihh such tchniques as steam collapse, particulate scrubbing and condensation of organic vapors. Over 20 MBTU/hour of cooling capacity is supplied on a cooling skid. Off-gasses are sub-cooled (using a chiller) and pass through vapor phase carbon polishing system and HEPA particulate filter. Oils, PCBs, and solids-condensed water are removed by coagulation, separation and filtration. Solids are collected and placed in containers for off island disposal. Water is polished prior to use to re-hydrate treated soils. The conditioned vapors are

Environmental Chemical Corporation
99-1151 Iwaena St.
Aiea, HI 96701

verified free of pollutants and then recycled to the dryer burners for treatment and disposal. Steam and dust resulting from cooling the treated soil is filtered through a particulate collector (bag-house) prior to reuse for seal purge.

Full system instrumentation includes programmable logic controls. Man-machine interface software provides operation and remote monitoring and data logging capabilities. An Automatic Waste Feed Shut Off (AWFSO) system protects against non-compliant conditions. A Continuous Emission Monitor (CEM) monitors oxygen concentration; other process variables are monitored and measured as required pursuant to permit conditions. An emergency cooling system assures steam/organic removal upon power outage or failure of other system components.

The ITD system consists of ten 40-foot ocean containers stacked to occupy an area of 66 feet by 61 feet. The system setup time is two weeks. Visible signs of operation include a cooling tower steam plume and a heat plume from the stack. Utility needs are water, fuel and electricity. The system will be operational 24 hours a day with a small crew.

2.0 ITD SYSTEM SCHEDULE

From initial equipment mobilization through demobilization, the ITD operations will be approximately 6 months. The Phase IV ITD Treatment Schedule has the following major milestones: mobilization, startup, demonstration test, interim operation, full-scale production, and demobilization. The dates and durations are included in the Phases III and IV Consolidated Project Schedule shown in Appendix A. ECC will implement the Phase IV ITD work within 15 days of receiving the Notice to Proceed (NTP). The ITD unit is currently under construction and functional testing in Indio, California.

After ECC receives NTP for field mobilization, construction of the temporary facilities will begin, including excavation activities to allow construction of the treatment area pad (concrete curbed area). All ITD utilities will be installed during this phase. Underground utilities are preferred to maximize use of the treatment pad. ECC will also develop an on-site office complex to support the operations.

Concurrently, the ITD unit will be shipped to the site from Indio, California via the port of Los Angeles. The shipping duration is expected to last 3 to 4 weeks. One final container will follow one month later, which will contain spare parts and materials for the operation (initial shipment will include a minimum of two months supply). ECC plans on shipping one container per month with supplies and reagents to sustain operations while minimizing excess hazardous materials storage. This will also allow for variations in operation rates and material needs.

Upon receipt at the site, ECC will start setting up the ITD system. As the process equipment erection nears completion (approximately two weeks), motors pumps control loops, and associated equipment will be bumped and functionally tested. Clean soil will be processed through the unit to assure the system has been installed correctly and to verify the functionality of the equipment under loaded conditions. All automatic waste feed shut offs (AWFSOs) will be tested prior to introducing contaminated material into the system. Contaminated soil will not be introduced before a reliability run has been performed. The reliability run shall demonstrate operation of the equipment for 23 hours out of 24 hours available.

ITD interim operation is scheduled to start immediately after shakedown testing is complete. During interim operations ECC will optimize the ITD process and prepare for the demonstration test. ECC expects a maximum of 850 cubic yards contaminated soil will be processed during the interim operating period including the demonstration test. During interim operations a mini test for PCB's will validate the performance of the air pollution controls systems. This mini test is described in detail in subsequent sections.

The demonstration test is scheduled over a two to three day period. Twenty to thirty days after completion, ECC will submit the demonstration test report.

While awaiting results the regulatory agency reviews of the test, ECC will operate the system at 75% of the design conditions tested during the demonstration test. ECC will continue to operate at this reduced rate until the results have been submitted and validated to meet the emission expectations set forth in this plan.

ITD full-scale operations will begin after regulatory (EPA) approval of the test report is complete.

After all contaminated stockpiled material has been treated through the process, ITD demobilization activities are scheduled to begin. The ITD demobilization activities are expected to take three weeks. The treatment area pad will scrubbed and remain for further site development.

2. 1 Island Logistics

Saipan has unique challenges for operation of a portable soil treatment plant. ECC has based its plan to deliver the process to Saipan based on having worked successfully on Saipan for over three years and having treated in excess of one million tons of soil throughout the world. Specific approaches to logistic planning include:

2.1.1 Assessment of Island Resources

ECC has ascertained that sufficient utilities are available through existing infrastructure to operate the ITD system. Fuel delivery will be completed by two fuel oil suppliers on island at 250 gallon per hour. Fuel will be stored in two existing fuel oil storage tanks near the site. The storage capacity will allow for 60 hours of operation.

Electrical needs are 0.75 mega-watts (MW) at peak use. This demand has been discussed with the power producer and can be met for the phase of the project. A stand-by generator will be included with the equipment to meet emergency needs including safe shut down of the equipment.

Suitable water supply in available in the village. ECC may boost the water pressure to meet minimum pressure needs of the ITD.

Equipment suppliers are available. This include crane service, earth moving equipment, telescoping fork lift and miscellaneous equipment for preparing the site.

Material suppliers are available, including an assessment of local stock of hardware items, electrical components and steel and welding supplies. ECC understands the limitations of these suppliers and has planned to fill key parameters with an inventory of spare parts and materials. This includes special stainless steel welding rods, stainless steel stock, large size fasteners, gasket material, insulation and special tools. The ITD is equipped with hand tools for servicing the equipment, three welding machines, pipe threading equipment, lights and saws. Electrical supplies include spare motors, gear reducers, motor controls, instruments, fuses and wire.

Materials used in the process including diatomaceous earth, sulfuric or phosphoric acid, biocide, water conditioner and polymer are planned to meet production. A start up supply will be shipped from

Environmental Chemical Corporation
99-1151 Iwaena St.
Aiea, HI 96701
May 2001

California with the equipment. On going needs will be met from world wide suppliers who have ship points in Japan, Australia, Philippines or the US.

ECC will use island contractors to the maximum extent for support to maintain, erect and ship the equipment. On island resources include machinists, electricians, welders, concrete installers, plumbers, security service etc.

ECC has identified an adequate work force from on island labor pool to support the work. It is anticipated that 15- 20 local laborers both skilled and unskilled will be required. The thermal system requires 8 fully trained specialists from the US to supplement the local labor support. Adequate housing of ITD specialist personnel is available on island.

2.1.2 Shipping Options

The ITD has been specifically assembled to meet shipping constraints for ease of transportation. The system can be transported by ship, rail or truck. Shipment of liquid reagents will be by drum in containers. Shipment of solids (diatomaceous earth) will be by pallet in a container. All shipment will follow shipping regulations including marking and hazardous separations.

The ITD may require a special part that may not be included as a spare in inventory. If the part is critical for safe continued operation and is required immediately, the part will be air freighted. Shipping of spares by air is routinely done, and will be managed by ECC. ECC will locate the closest supplier for the part to assure quick availability of unique supplies.

2.1.3 ITD Availability and Schedule Planning

ECC is experienced in operation and maintenance of ITD systems. Its staff have an average of over 14 years of experience in this field of work, assuring a successful project. ECC’s thermal equipment availability averages over 80% as the percentage of time the equipment is treating soil divided by calendar hours.

The ITD requires periodic maintenance that includes inspection and repair of system parts. The scheduled outages are typically every 10 days and last for 1-2 days. The scheduled outages allow ECC to plan for support subcontractors to arrives when the equipment is offline and service the equipment for continuing efficient operations. Forced outages are defined as a failure in a component that requires the equipment to be shut down immediately. Only 8 forced outages of the ITD per year has been experienced.

Due to unpredictable weather conditions, limitations of access to supplies and the relatively small size of the project will require ECC to plan for 60% availability for Phase IV operations. At this availability the ITD can be offline 4 out of every 10 days.

2.1.4 ITD Previous Use

The ITD process for the Tanapag work has been used successfully at other sites. The process has been "containerized" for use on Saipan. ECC has spent a significant effort on pre-operational equipment testing to avoid startup problems typical of new equipment. This approach will minimize delays and allow for a safer startup of the ITD system. ECC has performed this procedure for all existing thermal equipment.

3.0 SITE PREPARATION AND UTILITY REQUIREMENTS

The ECC ITD system is completely transportable, consisting of ten ocean containers interlocked to form a complete system. The unit will be transported to the job site for assembly by a nominal 50-ton hydraulic crane and an extendable forklift. The site must be prepared by leveling and contructing a concrete base with a load bearing capacity of 5,000 pounds per square foot.

A concrete pad (100 ft by 150 ft) will be the base for all processing equipment, the feed preparation area, decontamination pad, and treated soil storage area. The utility requirements for the system include makeup water, electricity, fuel oil and specialty gases for the oxygen analyzers. The pad will be sloped toward the center and slightly curbed for rainwater containment. A sump equipped with a pump will be installed for management of rain water at the lwo point of the pad. In the event of a Typhoon notice or alert, the equipment will be secured and the contaminated materials isolated and protected from the rain water. Operations will cease during severe weather alerts. The utility requirements are summarized in Table 1 and are described in detail below.

Table 1
ITD Utilities

ITEM	DESCRIPTION
Electric Power	460 volt, 3-phase, 60 cycle, 800 amp
Raw water makeup	150 gpm capacity @ 40 psi
Fuel Oil	35 MM BTU/hr (260 gph)
Liquid propane	100 gallon storage tank for pilot valves
Cylinder gas	2% O_2 in N_2, and 8% O_2 in N_2 calibration gases Nitrogen : Zero 0.2 grade calibration gas

Raw water makeup can be either potable or non-potable, and a 1-1/2” hose utility connection sized for 50 gpm flow is sufficient. Approximately 20,000 gallons of water is required to start the system (used as initial fill in the clarifier and filtrate tank), after which the system requires makeup water for the cooling tower and housekeeping purposes only. Brackish water supply available from the fire hydrant adjacent to the site has been verified as acceptable for the process use. The water pressure will be enhanced as required to meet the supply water pressure needs for the cooling tower. The water in the cooling tower will be conditioned with corrosion inhibitors to maximize equipment life. Biocide will be introduced into the cooling tower water loop to avoid microbial growth. Appendix B contains a report on the addition requirements of CT amendment and biocide addition.

The system requires 460 Volt (V), 60 Hertz (Hz) three-phase electrical supply. The connection point must allow a minimum of 800-Amps of service. The service should be equipped for a small neutral for 277 V lights. Power supply will be derived from the high voltage line adjacent to the site, which was used during previous treatment activities. A one-MVA transformer will be connected to the high voltage line and equipped with an 800-Amp disconnect breaker for the ITD unit. Reliable power has been addressed in the design and ECC will utilize an emergency generator to shut the system down in the event of a power failure.

The ECC ITD system can be operated using vaporized natural gas or a liquid oil system. Saipan does not have sufficient LPG or natural gas to support the ITD. For the Saipan project, number 2 fuel oil was selected. Two 6 thousand gallon oil tanks will be installed to store fuel oil. The storage tank will be installed in accordance with Federal Spill Prevention Controls and Countermeasures regulations that, at a minimum, include secondary containment and top mounted fuel piping. A fuel oil pump will be installed adjacent to the oil tank to provide fuel under pressure. An easy-access disconnect isolation valve will be provided to allow for emergency shut off of oil. The oil loop includes return piping to the tank. The tank will be located away from buildings and equipment in accordance with local code requirements. A minimum of 25 feet will be maintained between the oil tank and the drier burners. The tank will be accessible for filling from a tank truck.

Compressed cylinders of primary standard grade calibration gases are required. The oxygen analyzer calibration gases should be 4 % O_2 in nitrogen. The oxygen analyzer calibration gases should be within 5% of the nominal value. A zero grade nitrogen analyzer will be used for the oxygen analyzers zero adjustment. Each calibration gas must be accompanied with a certified analysis. Additional calibration gases will be utilized for handheld instruments for volatile organic compounds (VOCs) and Carbon Monoxide (CO). All calibration gases will be shipped with the equipment from the mainland. Calibration gases will be stored in accordance with OSHA requirements.

The ITD occupies a footprint of 61 ft by 67 ft by 48 ft tall. The total footprint of the equipment pad is 100 ft by 150 ft. The system operates 24 hours a day, 7 days a week except for shutdowns. Three shift operators will provide maintenance, set points, and maintain general control of the system. The system setup time is two weeks with three weeks' allowed for interim operations. ECC will complete mechanical and electrical checkout prior to system shipment.

ECC predicts soil treatment rates of 14 TPH for Saipan based on soil conditions and previous treatment temperatures used during the thermal blanket technology. Conservative temperature profiles and reduced productivity are planned to maximize passing treatment standards. Since logistic planning may interrupt the flow of soil, ECC plans for 60% availability (actual soil treatment / available hours)

ECC has placed the equipment in a compact yet workable configuration for the Saipan project to optimize separation and flow direction of contaminated material and treated soil. Some existing cells of contaminated soil adjacent to the TDU will be treated first in order to increase the separation distance and provide additional work area.

The equipment will be placed on a fiber-reinforced concrete pad curbed to contain spills and storm water. A poured sump and pump station will transfer liquids from the pad sump to the ITD water treatment system for treatment and disposal. Storage for treated and tested surface (rain) water (free of PCBs) is available for re-use and site dust control. The ITD is a zero process water discharge operation.

The control room is situated to allow for monitoring of the site. Special barrier will allow access to the office without requiring donning of PPE. The control trailer will be located in the contamination reduction zone. Operators will exercise a modest level of decontamination prior to each entry. This classification may be changed, depending on level of entries required.

ECC may utilize the existing pad on the site and add as appropriate. ECC will remove organic topsoil and level a work area for the ITD. ECC will excavate and place underground electric feeder conduit, gas line, water piping, drain sump and equipment ground connections. After forming the base, ECC will place a continuous pour pad. Curbs will be keyed into the pad and sealed following curing. Any cracks will be sealed with mastic following cure and equipment installation and startup. Concrete "dead men" may be installed on the system components to resist overturning due to high winds. The equipment has been designed to resist high (typhoon class) winds.

Equipment survey locations will be painted onto the pad prior to equipment placement. Final locations will be determined during installation. Supports for the equipment consist of wooden spread support shimmed to maintain the equipment level. Expansion joints, flexible piping and portable cords allow for differential settling in the equipment.

Water will be supplied by pipe from a source to the stubbed up connection adjacent to the pad. Hose will connect the stubbed connection on the pad to the ITD. A back-flow preventer is installed in the water system. ECC will track raw water use and rates as part of normal operation.

Power is supplied from a 4,800-V primary source overhead near the site boundary. Power will be routed on poles to a pad-mounted transformer adjacent to the control trailer on the ITD pad. The transformer reduces the voltage from 4,800 to 460 V three-phase delta-y for distribution by the ECC control system. The service will be 800 Amps per phase at the 460-V connection. A power distribution panel (located at elevation 10ft – Burner blower container) provides isolation and primary protection for downstream equipment. A backup generator supplies a portion of the power needed to operate the controls and safely shut the equipment down.

Water disposal consists of water blow down from the cooling tower. ECC predicts blow down rates of up to 11 GPM during equipment operation. <u>This water is non-contact cooling water. It will not come into contact with any waste. All process water is recycled to the soil and does not exit the ITD.</u> A discharge drain will be established to accept this non-contact water discharge and any treated and confirmed excess site or storm water. This discharge will consist of a sump placed outside the concrete area at a shallow depth. The sump design is a French-drain type reintroduction basin. Water disposal will follow requirements of Federal and CNMI regulations that include testing.

3. 1 System Installation (pg 2290-2, 1.3.1.2)

The installation of the ITD system involves setting all containers and skids at the job site, installing the interconnecting ducting, piping, and hoses, installing equipment that was removed for shipment, and connecting the system to utilities. The details of these operations are documented below along with detailed equipment installation requirements outlined within the vendor manuals. This section provides guidance as to the sequence that should be followed in setting up the equipment, along with an explanation of the interface points between the trailers, skids, and ancillary equipment. A small crane will be required for some of the system assembly. The crane should have at least a 50-foot boom and a capacity of 35 tons. Drawing GA-1-01 is a site layout drawing showing the general arrangement of the equipment after installation at the existing site. The drawing must be used during setup to properly locate the trailers and skids along side each other and to layout the location of utility services for the system. It should also be used for reference when installing removable pieces of equipment such as the vapor and liquid phase carbon cells.

The alignment and spacing of the containers and skids must be very close to the dimensions given on the equipment dimension layout drawing. Refer to drawing GA-1-02 and GA-1-03, Detailed Equipment Plan and Utility Plan, for the required equipment spacing. Reference markers have been attached to the trailers and skids as a benchmark for measurement. Where gas ducting has expansion joints on both ends, alignment must be within plus or minus 3 inch. Where the gas ducting has no expansion joint, alignment of the trailers and skids should allow for flanges to be mated and bolted without inducing distortion in the piping.

3.1.1 Process Equipment

Table 10 (section 10) includes the process components comprising the ITD system. The system is housed with 11 containerized modules each 8 feet wide and 40 feet long. Three of the containers are inverted and stood on end. Of the horizontal containers, one sets next to a stack of two. One group is stacked three high. The dryer is a single custom frame that rests on a support structure.

3.1.2 Soil Conditioner Installation

The soil conditioner container is a freestanding vertically placed unit. The soil conditioner container shall be located prior to placement of the dryer frame. A crane will be used to place the soil conditioner vertically to the markings. Once installed, erection of structural supports for the dryer will begin so the dryer can be placed on the frame. Holding staff length is critical for proper alignment of the discharge expansion joint.

3.1.3 Dryer Installation

The dryer frame should be set into position using the established reference points on soil conditioner container in conjunction with the equipment dimension layout drawing. The dryer weighs 100,000 pounds or fifty tons. The dryer should be placed using two cranes and lifted only from lifting eyes.

Once the dryer is in place, the hot box will be attached.

The exhaust gas stack will be lifted from two opposing lifting lugs. The stack will be fastened to the precipitator for support. A gasket is not necessary since the stack will be under negative pressure.

The transition between the dryer discharge should also be installed. A ladder or man-lift will be required to access the flanges and install 3≅ thick high-temperature gasket material. Appropriate fall protection must be worn at all times. Care must be take to assure this expansion joint connection is installed per the factory tolerance.

The combustion air header will be mounted on the dryer and the appropriate flanges will be fastened together. The fuel header will also be mounted at this time and the appropriate unions should be tightened. The auger feeder should be installed to the access opening in the feed breech cover plate. The conveyor has a flange which mates to the breaching cover plate. A bead of high temperature R.T.V. (550 F) will be used between the flanges. This caulk will form an airtight gasket when the flanges are drawn flush to each other. The support leg mounts to the dryer frame should be fastened in place.

3.1.4 Feed System Installation

Attach the support legs to the underside of the transfer conveyor and use a crane to set the conveyor into position. Install the transfer conveyor according to the dimensions shown on the equipment dimension drawing. The supports should be attached to the concrete pad using concrete anchor bolts.

Position the mass flow feeder according to the dimensions shown on the equipment dimension drawing. The discharge of the mass flow feeder should be installed on the centerline of the transfer conveyor hopper. The supports should be attached to the concrete pad using concrete anchor bolts.

3.1.5 Discharge System Installation

The soil conditioner auger is shipped loose and is attached to the discharge valves in the soil conditioner container by way of expansion joints. Place the soil conditioner auger under the valves and mate the expansion joint connections. Electrical connections shall be pin and sleeve cables.

Attach the support legs to the underside of the radial stacker and use a crane to set the conveyor into position. Install the radial stacker according to the dimensions shown on the equipment dimension drawing. The base / pivot plate of the radial stacker should be attached to the concrete pad using concrete anchor bolts beneath the soil conditioner discharge spout on the centerline of the soil conditioner.

3.1.6 Filtrate Tank Installation

Install the filtrate tank according to the dimensions shown on the equipment dimension drawing. Level the tank front to back and side to side with shims. Affirm that the tank is level by using a water level. The filtrate and clarifier tanks also have the transfer pumps and bag filters/strainers mounted on skids for installation at the ends of the tanks. The pumps should be plumbed and plugged in to the control panel.

3.1.7 Filter Press Installation

The filter press is loose and sets on the concrete pad. Tote is installed below the press to collect the cake and aid in cake management. The press needs air and plumbing connections. There are no electrical connections to the filter press.

3.1.8 Control, Burner Management and Cooling Tower

The control container is to be set on grade adjacent to the soil conditioner. Lock the bottom corners of the containers together. A stair-and-platform assembly from the control room leads to the burner/electrical distribution container.

The burner management container fits on top of the control room container. The fit of container is accomplished with twist locks. The cooling tower container is placed on top of the burner management container and secured with twist locks. A ladder and platform is attached to the cooling tower from the burner management container to allow access to the cooling tower.

3.1.9 Clarifier and APC Container

The clarifier is a container that is placed on the concrete. The clarifier pump skid is connected to the clarifier clear well. The APC container is set on top of the clarifier. The custom piping bolts between the APC and the clarifier. Piping, ductwork and power also connect to the APC. Ductwork from the precipitator also connects to the top of the APC.

3.1.10 Precipitator Installation

The precipitator should be assembled while horizontal. The shipping bolts should be removed prior to raising to the vertical position. Cables should be run from the upper casing to the clarifier corner and the dryer frame as shown on the drawing.

The cables are important to avoid the overturning for installation in the Typhoon zone.

3.1.11 Electrical / Instrumentation / PLC Installation

A grounding grid will be installed under the ITD concrete pad and grounding attachments will be stubbed up in appropriate locations. All skids and ancillary equipment will be attached to the grounding grid. Power from offsite will be routed overhead to the ITD pad and then routed underneath the pad and stubbed up in the appropriate location. All inter-connect / skid power, instrumentation and communication connections not terminated during transportation have been outfitted with a plug assembly with a few exceptions. These plugged assemblies have unique identification marks to allow reconnection. Those power cords without plug assemblies will be field-routed and terminated at the panels and equipment.

Environmental Chemical Corporation
99-1151 Iwaena St.
Aiea, HI 96701

3.1.12 Interconnecting Hoses and Flexible Duct Installation

The interconnecting hoses and ducting have been outfitted with quick disconnect adapters and couplings as well as hose clamps. Each hose and duct has a unique identification mark for reconnection.

3.1.13 Lighting Component Installation

Lights are installed on the cooling tower, precipitator and APC to provide illumination for the entire ITD pad during night operations. The lighting components on the containers ship intact and need to be adjusted into final position once the containers are positioned. The dryer trailer lighting components will be mounted once the trailer is in its final position.

3. 2 Post Installation Checkout

Before initiating start-up, it is important to inspect the equipment to verify that no damage has occurred during transport and that the installation has been correctly performed. Before operation of any equipment such as centrifugal pumps, blowers, fans, powered valves and monitoring equipment, etc., certain initial checks are required. Wherever possible, before operation, hand rotate equipment to ensure that it rotates or cycles freely. Remove any dirt or dust from shipment, storage or installation. Before operation of equipment be familiar with safety procedures outlined in the vendor manuals.

4.0 CONTROLS & INSTRUMENTATION

ECC has selected the best quality instrumentation for monitoring and operation of the control system. The following list represents only the instruments that require calibration. The frequency for calibration is also stated. The frequency is based on expected need. ECC will maintain the calibration list active and will lengthen or shorten calibration frequency dependant on variation or drift of instruments. Unless specified by regulatory requirements, the frequency shall be determined by ECC after the first monthly meeting. Copies of instrument calibration sheets will be maintained in the thermal operation area on site.

ECC selected PLC input modules specifically designed for instruments to reduce calibration requirements and improve overall accuracy; they include all temperature measurement and flow transmitters. Thermocouples and thermocouple wire is used between the junction and the PLC input. The PLC input provides analog to digital conversions and cold junction compensation. The digital values are calculated in degree F. Broken thermocouple (zero voltage) is reported as 8,000 degrees and an alarm is indicated.

A unique feature of the ECC controls is the use of paddle wheel type flow meters. Paddlewheel flow meters use a hall effect pick up to rotating magnets. The pickup creates a semi square wave pulse based on velocity in the pipe. The ECC PLC converts the pulse frequency and pipe correction factors to the total volume or flow rate. Since the paddle wheel is permanently lubricated, routine maintenance is not required. Since no flow rates are critical for operation (see control description) data is used for tuning and process monitoring. Failure of paddle wheel is determined by pipe pressure monitoring.

Copies of calibration forms and manufactures instructions are included as available. Note the area for comments is used to denote dirty conditions, corrosion, or damage. These forms will be evaluated by the thermal operations team to diagnose application or training needs.

The lead operators are responsible for visual evaluation to the condition of all instruments. During scheduled shut downs the instrument tech will evaluate convenient instruments for signs of corrosion, damage or faulty performance. Spare parts or replacements are stocked for most instruments.

INSTRUMENT LIST ECC THERMAL - SAIPAN									
ID	**PWR**	**I/O**	**TYPE**	**MOUNT**	**RANGE 1**	**RANGE 2**	**DESCRIPTION**	**LOCATION**	**MANUFACTURER**
AT-151	24	AI	CONC	NPT	0-20%	4-20 MA	O2 CONCENTRATION	CONTROL	
DPT		AI	PRESSURE	NPT	0-30	4-20 MA	VENTURI DP	APC	OMEGA
FT-102		AI	FLOW	NPT	0-5"	4-20 MA	RECIRC FLOW	APC	OMEGA
FT-151		AI	FLOW	NPT	0-2.5"	4-20 MA	VENT FLOW O.P.	APC	OMEGA
PT-101		AI	PRESSURE	NPT	0-10"	4-20 MA	RECIRC OUTLET	APC	OMEGA
PT-151		AI	PRESSURE	NPT	0-30"	4-20 MA	ID FAN INLET	APC	OMEGA
PT-240		AI	PRESSURE	NPT	0-60 PSI	4-20 MA	SCRUBBER PRESSURE	APC	OMEGA
TE-062		AI	TEMP	NPT	TYPE J	0-200	COND SCRUBBER OUTLET	APC	OMEGA
TE-063		AI	TEMP	NPT	TYPE J	0-200	VENTURI OUTLET	APC	OMEGA
TE-070		AI	TEMP	NPT	TYPE J	0-200	CONDITIONING OUTLET	APC	OMEGA
TE-101A		AI	TEMP	NPT	TYPE J	0-200	CONDITIONING OUTLET	APC	OMEGA
TE-120A		AI	TEMP	NPT	TYPE J	0-200	COIL OUTLET	APC	OMEGA
TE-120B		AI	TEMP	NPT	TYPE J	0-200	COIL OUTLET	APC	OMEGA
TE-151		AI	TEMP	NPT	TYPE J	0-201	GAS TO VENT	APC	OMEGA
TE-261		AI	TEMP	NPT	TYPE J	0-200	CHILLER GLYCOL OUT	APC	OMEGA
TE-271		AI	TEMP	NPT	TYPE J	0-200	CHILLER GLYCOL IN	APC	OMEGA
FT-240		DI	FLOW	SPECIAL	0-20 FPS	PULSE	SCRUBBER FLOW	APC	OMEGA
FT-244		DI	FLOW	SPECIAL	0-20 FPS	PULSE	VENTURI FLOW	APC	OMEGA
DPI-063			PRESSURE	NPT	0-30		VENTURI DP	APC	DWYER
DPI-110A			PRESSURE	NPT	0-6"		GRAVEL DP	APC	DWYER
DPI-110B			PRESSURE	NPT	0-6"		GRAVEL DP	APC	DWYER
DPI-120A			PRESSURE	NPT	0-6"		AC COIL DP	APC	DWYER
DPI-120B			PRESSURE	NPT	0-6"		AC COIL DP	APC	DWYER
DPI-130A			PRESSURE	NPT	0-6"		CARBON DP	APC	DWYER
DPI-130B			PRESSURE	NPT	0-6"		CARBON DP	APC	DWYER
DPI-140A			PRESSURE	NPT	0-6"		HEPA DP	APC	DWYER
DPI-140B			PRESSURE	NPT	0-6"		HEPA DP	APC	DWYER
LG-271			LEVEL	NPT	TUBING		GLYCOL SIGHT GAUGE	APC	MCMASTER
PI-060			PRESSURE	NPT	0-6"		SCRUBBER INLET	APC	DWYER

INSTRUMENT LIST ECC THERMAL - SAIPAN									
PI-100			PRESSURE	NPT	0-30		RECIRC FAN INLET	APC	DWYER
ID	**PWR**	**I/O**	**TYPE**	**MOUNT**	**RANGE 1**	**RANGE 2**	**DESCRIPTION**	**LOCATION**	**MANUFACTURER**
PI-240			PRESSURE	NPT	0-60		SCRUBBER WATER PRESSURE	APC	MCMASTER
PI-261			PRESSURE	NPT	0-30		GLYCOL PUMP OUTPUT PRESSURE	APC	MCMASTER
AT-200		AI	PH	NPT	0-14	4-20 MA	PH CLEAR WELL	APC/CL	OMEGA
LT-200		AI	LEVEL	NPT	0-10'	4-20 MA	LEVEL CLARIFIER	APC/CL	OMEGA
FT-057		AI	FLOW	SPECIAL	0-1"	4-20 MA	SCUBBER INLET	APC/PRE	OMEGA
TE-057		AI	TEMP	NPT	0-1200		SCRUBBER INLET TEMP	APC/PRE	OMEGA
PI-273B		AI	PRESSURE	NPT	0-30		AMMEND. WATER PRESSURE	CT	MCMASTER
TE-201		AI	TEMP	NPT	TYPE J	0-200	CT INLET	CT	OMEGA
TE-202		AI	TEMP	NPT	TYPE J	0-200	CT RETURN WATER	CT	OMEGA
TE-203		AI	TEMP	NPT	TYPE J	0-200	EXCHANGER CW RETURN	CT	OMEGA
TE-204		AI	TEMP	NPT	TYPE J	0-200	CHILLER CW RETURN	CT	OMEGA
TE-232		AI	TEMP	NPT	TYPE J	0-150	CLARIFIER OUTLET	CT	OMEGA
TE-240		AI	TEMP	NPT	TYPE J	0-150	SCRUBBER INLET	CT	OMEGA
TE-260		AI	TEMP	NPT	TYPE J	0-150	CT OUTLET	CT	OMEGA
TE-270		AI	TEMP	NPT	TYPE J	0-150	CT INLET	CT	OMEGA
FT-262	24	DI	FLOW	SPECIAL	0-20 FPS	PULSE	CW TO EXCHANGER	CT	OMEGA
FT-265	24	DI	FLOW	SPECIAL	0-20 FPS	PULSE	CW TO CHILLER	CT	OMEGA
FI-262			FLOW	NPT	0-10 GPM		CT BLOW DOWN	CT	OMEGA
LSH-273A	120		LEVEL	SPECIAL			BIOCIDE AMMENDMENT	CT	APPLIED PROCESS
LSH-273B	120		LEVEL	SPECIAL			CONDIT AMMENDMENT	CT	APPLIED PROCESS
LSL-273A	120		LEVEL	SPECIAL			BIOCIDE AMMENDMENT	CT	APPLIED PROCESS
LSL-273B	120		LEVEL	SPECIAL			CONDIT AMMENDMENT	CT	APPLIED PROCESS
PI-232A			PRESSURE	NPT		0-60	SCRUBBER SIDE ECHANGER	CT	MCMASTER
PI-232B			PRESSURE	NPT		0-60	SCRUBBER SIDE ECHANGER	CT	MCMASTER
PI-232C			PRESSURE	NPT		0-60	SCRUBBER SIDE ECHANGER	CT	MCMASTER
PI-262A			PRESSURE	NPT		0-30	CT SIDE ECHANGER	CT	MCMASTER
PI-262B			PRESSURE	NPT		0-30	CT SIDE ECHANGER	CT	MCMASTER
PI-262C			PRESSURE	NPT		0-30	CT SIDE ECHANGER	CT	MCMASTER

INSTRUMENT LIST ECC THERMAL - SAIPAN									
PI-273A			PRESSURE	NPT	0-120		AMMEND. WATER PRESSURE	CT	MCMASTER
LT-201		AI	LEVEL	NPT	0-10'	4-20 MA	LEVEL MIX TANK	MIX	OMEGA
ID	**PWR**	**I/O**	**TYPE**	**MOUNT**	**RANGE 1**	**RANGE 2**	**DESCRIPTION**	**LOCATION**	**MANUFACTURER**
LT-204		AI	LEVEL	NPT	0-10'	4-20 MA	LEVEL FILTRATE TANK	MIX	OMEGA
PT-203		AI	PRESSURE	NPT	0-100	4-20 MA	PROCESS WATER PRESSURE	MIX	OMEGA
PI-201			PRESSURE	NPT	0-120		PRESS INLET	MIX	MCMASTER
PI-203A			PRESSURE	NPT	0-120		FILTRATE BAG INLET	MIX	MCMASTER
PI-203B			PRESSURE	NPT	0-120		FILTRATE BAG OUTLET	MIX	MCMASTER
PT-051		AI	PRESSURE	NPT	0-5"	4-20 MA	DISCHARGE BREACH PRESSURE	SC	OMEGA
TE-050		AI	TEMP	NPT	TYPE K	0-1200	SOIL OUTLET	SC	OMEGA
TE-056		AI	TEMP	NPT	TYPE K	0-500	SC OUTLET	SC	OMEGA
TE-54		AI	TEMP	NPT	TYPE K	0-500	BH OUTLET	SC	OMEGA
DPI-51A			PRESSURE	NPT	0-6"		MULTI CLONE DP	SC	DWYER
DPI-54A			PRESSURE	NPT	0-20"		BAGHOUSE DP	SC	DWYER
PI-54A			PRESSURE	NPT	0-60		PULSE AIR PESSURE	SC	MCMASTER

LOAD LIST ECC THERMAL - SAIPAN

Description	Quantity	QD Required	Hp	Voltage	Use Factor	KW	KVA Con.	Comment	FLA	Wire	BKR	Panel #
Acid Injection Pump	1	1	0.25	120	0.5	0.11	0.23	RELAY PLC	1	18	1	APC
Clarifier Drag Chain	1	0	2	460	0.9	1.58	1.87	BKR/MS	3.4	14	15	APC
Control Transformer	1	0	2	460	0.2	0.35	1.87	FUSE	5	14	5	APC
Glycol Pump	2	0	3	460	0.9	2.37	2.80	BKR/MS	4.8	14	15	APC
Control Transformer	1	0	1	460	0.5	0.44	0.93	FUSE	7.6	14	15	APC
Cooling Tower Fan A	1	0	7.5	460	0.9	5.92	6.99	BKR/MS	10	14	20	CT
Cooling Tower Fan B	1	0	7.5	460	0.9	5.92	6.99	BKR/MS	10	14	20	CT
Cooling Tower Fan C	1	0	7.5	460	0.9	5.92	6.99	BKR/MS	10	14	20	CT
Cooling Tower Fan D	1	0	7.5	460	0.9	5.92	6.99	BKR/MS	10	14	20	CT
ID Fan	1	0	10	460	0.7	6.14	9.33	BKR/VFD	14	12	30	APC
Welder	1	1	20	460	0.2	3.51	3.00	BKR	20	12	20	SC
CT Ammend. Pump A	1	0	0.25	120	0.9	0.20	0.23	FUSE	1	18	1	CT
Recirc Fan	1	0	30	460	0.8	21.06	27.98	BKR/VFD	40	8	50	APC
Control Transformer	1	0	2	460	0.9	1.58	1.87	FUSE	5	14	5	APC
Air Compressor	1	0	40	460	0.9	31.60	37.30	BKR/MS	52	6	90	APC
Plasma Cutter	1	1	20	460	0.9	15.80	18.65	BKR/MS	20	12	20	SC
Control Transformer	1	0	2	460	0.9	1.58	1.87	FUSE	5	14	5	BMS
Mix Tank Mixer A	1	0	10	460	0.9	7.90	9.33	BKR/MS	14	12	30	BMS
Mix Tank Mixer B	1	0	10	460	0.9	7.90	9.33	BKR/MS	14	12	30	BMS
Precoat Tank Mixer	1	0	2	460	0.9	1.58	1.87	BKR/MS	3.4	14	11	BMS
Bag House Blower	1	0	30	460	0.9	23.70	27.98	BKR/VFD	40	8	90	SC
Auger - Feed	1	0	30	460	0.2	5.27	3.00	BKR/VFD	40	8	90	BMS
Power KVA	1	0	15	460	0.9	11.85	13.99	BKR	30	10	30	BMS
Soil Conditioner	1	0	30	460	0.9	23.70	27.98	BKR/MS/REV	40.1	8	90	SC
Stacker Belt	1	1	10	460	0.7	6.14	9.33	BKR/VFD	14	12	20	APC
Drier VFD	1		0	460	0.8	-	-	BKR/MS			200	BMS
Polymer Agitator	1	1	1	460	0.2	0.18	1.00	BKR	2.1	14	2	APC
Control Transformer	1	0	1	460	0.8	0.70	0.93	BKR/MS	2.1	14	2	CT
Lights KVA	1	0	5	277	0.5	2.19	4.66	BKR/REL	11	14	10	CT

LOAD LIST ECC THERMAL - SAIPAN

Description	Quantity	QD Required	Hp	Voltage	Use Factor	KW	KVA Con.	Comment	FLA	Wire	BKR	Panel #
Drier Rotation A	1	0	25	460	0.9	19.75	23.31	OL	34	8		BMS
Drier Rotation B	1	0	25	460	0.9	19.75	23.31	OL	34	8		BMS
Drier Rotation C	1	0	25	460	0.9	19.75	23.31	OL	34	8		BMS
Drier Rotation D	1	0	25	460	0.9	19.75	23.31	OL	34	8		BMS
Polymer Injection Pump	1	1	0.25	120	0.5	12.50	5.00	FUSE	1	18	1	APC
Refrig. Package	1	0	20	460	0.8	17.55	23.31	BKR	27	10	50	APC
Recirc 1 Pump	2	0	40	460	0.8	17.55	23.31	BKR/MS	52	6	90	APC
Water Pump	2	0	5	460	0.2	0.04	1.00	BKR/MS	7.6	14	15	APC
CT Ammend. Pump A	1	0	0.25	120	0.6	10.53	18.65	FUSE	1	18	1	CT
Cooling Water Pump	2	0	20	460	0.9	31.60	37.30	BKR/MS	26	10	40	CT
OUTLET				460	0.05	0.22	4.66	BKR	20	12	20	SC
Fuel Pump	1	1	1	460	0.5	0.13	15.00	BKR	2.1	14	15	SC
Lights KVA	1	0	5	460	0.6	10.53	18.65	BKR/MS	11	14	10	SC

OL - Overload
BKR - Breaker
MS – Motor Starter
VFD – Variable Frequency Drive
FLA – Full Load Amps

APC – Air Pollution Control Panel
CT – Cooling Tower Control Panel
SC – Soil Conditioner Control Panel
MIX – Mix Tank Control Panel
BMS – Burner Management Control Panel

4. 1 Control System Plan

The ECC control system is modular in design to accommodate different operating conditions, allowing for easy installation and reducing wiring for simplified ITD system installation. The design incorporates five programmable logic controllers for all relay, interlock, shut down, monitoring, and timing and control functions. The PLCs are Koyo, with DL250/DL 240 CPUs all with networking capability. The features of the PLC and capabilities are included in product literature attached.

Each PLC is equipped with inputs and outputs, both analog and digital. Digital I/O consists of AC and DC inputs and AC outputs. Some outputs are configured as dry contact to allow for interface with variable frequency drives. All AC is 120 volts. AC outputs drive solenoid valves or motor starters. AC inputs are from switches such as motor overloads and limits or flow meters. DC inputs are for speed sensors and limit switches All DC is 24 Volts.

Analog I/O (input / output) is mainly thermocouple inputs, current inputs, and magnetic pickups. The current inputs are standard 4-20 ma with a 24 VDC drive voltage. Analog outputs provide control outputs for the process. All outputs are 4-20 ma. Analog outputs drive the variable frequency motor controllers and control valves.

To reduce wiring between trailers, ECC uses five control panels. Each control panel contains motor starters for adjacent equipment, a PLC for control, and an operator interface display. The control panels are networked together. A single PLC is the master and the rest act as slaves to the network. A computer datalogger will be installed in the control room and the engineering office for process monitoring. The computers will also be networked together. The PLC can operate to a safe mode should the network be disconnected.

The push button panel and operator interface display allow an operator full control of the plant at the remote locations. An operator can start and stop motors, monitor process variables (temperatures, flows, pressures) or make adjustments to process (feed rate, draft adjustments, retention time, set points).

Safety is an important design consideration on the plant. Since the indirect process creates a potentially explosive gas, stopping the system is undesirable. Several features are incorporated to protect the workers, equipment and environment. First is a series of pull cords that will stop conveyors. The exposed conveyors (no guards over idlers) have pull cords for safety. Actuation of the pull cord will stop the conveyor and equipment feeding it. Essentially, the activation of a pull cord will latch the interlock. The condition cannot be reset without closing the pull switch and restarting the motors in sequence.

An automatic waste feed shut off (AWFSO) is a latching relay (soft) required to stop the introduction of waste into the system in the event of a process upset, out of compliance condition or an emergency situation. The ECC AWFSOs perform the following actions:

- Set Feed rate to 0;
- Stop feed auger;
- Set Drier rotation to low;
- Reduce burner firing rate

All off-gas treatment, water treatment, and soil conditioning equipment continue to process as if under normal operation. A Prolonged AWFSO will yield a complete burner shut down and total plant shut down. See the steps outlined below.

4. 2 AWFSO Conditions

DESCRIPTION	SPECIFICATION
High Vapor Temperature following Coil	>80 deg F for 5 minutes
High Process Oxygen	>5% for 5 minutes
High soil feed rate	>20 tons/hour for 5 minutes
Loss of Process Water	<100 gpm
Loss of Fan	Overload alarm
Positive Pressure in Dryer	>0.01 " for 2 minutes
Emergency Vent Open	Any occurrence

An AWFSO may be actuated manually from the operator push button locations. The Off specification conditions listed above will trip the AWFSO relay. Conditions that will also stop the soil feed are pull cord open, operator initiation mechanical or electrical overload of downstream conveyor. A burner failure will stop contaminated soil feed.

Burner safety includes purge requirements, fuel pressure checks, flame detection, and over temperature conditions. Any failure of the eight burners will isolate the fuel train and cancel all firing. Any communication error in the control system will cease all firing.

The most difficult process to resolve is a power failure. The system must be carefully vented in case of power failure. To perform this function, a backup generator is employed to perform ventilation through bare minimum-control equipment to protect the environment. The steps upon power failure are as follows:

- Failure in power detected by total loss of equipment;
- APC Control system remains online (PLC and computer powered by noninterruptible power supply UPS);
- Operator initiates back up generator;
- Transfer switch manually activated for power for several systems including control room and ID fan;
- ID fan set to ventilate drier under negative pressure through vent stack;
- Emergency Cooling Water Pumps Starts Automatically

- APC consists of cooling with open loop water sprays, activated carbon and HEPA filtration;
- Upon completion of ventilation, the system is completely shut down; and
- If power is resumed, total plant start up can be resumed.

For other control descriptions see back up and redundancy analysis.

4. 3 Procedure for Verifying Functions

During the course of this check out, all functionality of the equipment and controls will be verified. In general, the check out is by system or loop.

For example, the scrubber loop controls. This includes flows, pressures and temperatures. The manufacturer has suggested flow rates to various sections of the scrubber system. ECC will set the flow to each area using the installed flow meters. Upon this setup, ECC will track the pressure gauge readings and flow monitors to meet the scrubber temperature at various locations on the equipment. To cause alarms in the scrubber system, these are flow and temperature, ECC has built flexibility into the wiring method to allow for testing. In the case of temperature, the thermocouple element can be removed to simulate broken elements. A test element can be inserted to simulate various temperatures for other alarms.

The process of AWFSO verification is similar to the scrubber mentioned above. Each AWFSO parameter will be tested by manually overriding the set points of the sensor, instrument or switch that controls the parameter. The response to the AWFSO will then be observed. If the response is not satisfactory, then modifications to the set point, controls, or PLC algorithm will occur until the AWFSO responds appropriately. All AWFSOs will be verified prior to introducing contaminated material into the ITD process. ECC will make available functional check out sheets for loops as they are developed.

4. 4 Sampling and Analysis

ITD sampling and analysis to be performed at the Saipan project consists of the following:

- Treated soil will be tested to certify clean up levels have been attained whenever contaminated material is being processed through the system. ECC will collect one spot sample every 50 tons of feed material from the soil conditioner discharge. The sample will be a composite for each 250 tons
- The process oxygen concentrations will be monitored during all phases of ITD operations.
- Regulatory testing will be required during the demonstration test, interim operations, full-scale operations, and decontamination phases of the project.
- Initial performance testing will be required during the demonstration test.
- Operational testing for system maintenance will also be conducted during the demonstration test, interim operations, full-scale operations, and decontamination phases of the project.

Soil sampling will be performed by ITD operations staff trained in procedures specified in the SAP. Sampling will be a composite of soil collected from the soil conditioner discharge. The USACE will be provided copies of all results.

Process oxygen will be measured at the ID Fan inlet. A paramagnetic oxygen analyzer, manufactured by California Analytical, pulls a sample of gas through a filter and drying system to measure and report oxygen levels in the process gas. The data collected is electronically and stored in the AIMAX system in 15-minute averages. The USADE will be provided copies of all data.

All process variables will be recorded on a fifteen-minute average and archived in the data logging system.

Table 6 is the proposed Testing Matrix

Unless specifically contracted, data from operational testing shall remain for exclusive use by ECC. Release of information may be made, on approval of the site project manager.

Activated carbon breakthrough testing for PCB sampling will consist of a volume grab sample extracted through a PCB adsorbent cartridge, followed by laboratory analysis. The sampling will consist of a known volume of gas pulled through a fresh cartridge. The gas will be pulled with a diaphragm pump. The volume of gas will be measured with a gas meter. The volume of gas required will be based such that a representative amount of PCB recovery can be performed on the cartridge. The procedure is attached by appendix.

Water sampling will consist of a grab sample following the SAP sample prep and storage requirements and subsequent laboratory analysis. No water will be disposed in the French drain unless PCB levels the meet discharge standard for PCB. Information will be developed that will allow ECC to maximize the PCB removal and still meet soil discharge criteria.

5.0 INTERIM OPERATION AND DEMONSTRATION TEST CONTINUOUSLY MONITORED AND RECORDED PROCESS PARAMETERS (PG 2290-3, 1.3.1.4)

Table 4 lists the operating ranges expected during ITD interim operations and demonstration testing for those process parameters which are continuously monitored and recorded. These parameter ranges will be verified in the demonstration test. A detailed demonstration test schedule can be found in section 2 of the Treatment Plan. The ranges outlined in Table 4 are minimum and maximum values ECC expects during ITD operations. The ranges will vary as ambient conditions, throughput rates and the soil characteristic change. For additional information on these operating ranges, refer to the heat and energy balance presented in section 13.

5. 1 Demonstration Test Protocol

A demonstration test protocol will be submitted to the EPA and the USACE. ECC will schedule and perform a demonstration test in accordance with EPA testing protocols. ECC will give both the USACE and the EPA at least seven days prior notice before the demonstration test is performed. Table 6 outlines demonstration testing and methods to be utilized.

ECC will assess records of soil placement operations coupled with soil analytical data to assess the most contaminated cell. This soil will be utilized for the performance demonstration test. Table 7 indicates predicted performance of DRE measured at the vent location for variations in soil feed PCB concentration. In the event that high contamination cannot be found to assure PCB removal efficiency demonstration, ECC will blend filter cake into the feed to raise the inlet PCB concentration.

The filter cake recycled will be collected and stored from the start up operations. It is expected that the filter cake concentration of PCB will be 50 to 100 times the concentration of feed values expected to be near 25 mg/kg. The recycle of filter cake will consist of blending the filter cake with excavated soil from the cells using a rubber tire loader. The soil will be kept in the OMNI (tent) structure until the period of the source testing. Immediately following the source testing the introduction of blended material will cease and lower contaminated soils will be introduced while awaiting results.

Table 4
Continuously Monitored and Recorded ITD Process Parameters

INSTRUMENT TAG NO	DESCRIPTION	EXPECTED OPERATING RANGE	STD. UNITS
AIT-061	O2 CONCENTRATION	0.0 to 4.0	%
FT-151	CONDENSER VENT FLOW	200 to 1000	ACFM
FT-240	SCRUBBER INLET FLOW	250 to 750	GPM
FT-244	VENTURI SECTION FLOW	10 to 100	GPM
TE-062	CONDIT. SCRUBBER OUT TEMP	110 to 160	degrees F
TE-063	VENTURI OUT TEMP	90 to 140	degrees F
TE-065A	COND. SECTION 1 OUT TEMP	70 to 120	degrees F
TE-070	DEMISTER OUT TEMP	40 to 65	degrees F
TE-101A	COIL OUTLET TEMP	40 to 90	degrees F
TE-151	PROCESS VENT TEMP	40 to 90	degrees F
TE-240	SCUBBER INLET TEMP	80 to 135	degrees F
TE-260	COOLING TOW. OUTLET TEMP	65 to 110	degrees F
TE-270	COOLING TOW. INLET TEMP	70 to 140	degrees F
TE-050	DRYER SOIL DISCHARGE TEMP	500 to 1200	degrees F
TE-051A	DRYER SHELL TEMP	500 to 1400	degrees F
TE-051B	DRYER SHELL TEMP	500 to 1400	degrees F
TE-055	DRYER OUTLET TEMP	300 to 1200	degrees F
TE-060	CYCLONE VAPOR OUT. TEMP	300 to 1200	degrees F
TE-090	BURNER EXHAUST GAS TEMP	300 to 1400	degrees F
TE-300	SOIL CONDITION. OUT. TEMP	80 to 185	degrees F
AIT-065	SCRUBBER PH	3 to 10	units of PH
DPT-012	DRYER ABS. PRESS	0 to –1	in. water
DPT-101	GRAV. FILTER ABS. PRESS	20 to -20	in. water
DPT-102	SCRUBBER DP	0 to 20	in. water
DPT-155	ID FAN INLET ABS. PRESS	0 to -20	in. water
PIT-250	WATER PUMP PRESS CTRL	20 to 65	PSI
PT-185	WATER INLET	0 to 50	PSI
PT-400	AIR PRESSURE	60 to 100	PSI

Table 7

Input Data		**Required PCB Conc. In Feed (mg/kg)**
Soil Feed Rate (tons/hr)	15.0	
POHC Name	PCB	
POHC Molecular Weight	112.563	
Dry Stack Gas Flow Rate (dscfm)	500	
DRE Requirement (%)	99.9999	
Expected DRE (%)	99.99999	
Lower Quantitation Limit (ug/sample)	0.02	
Upper Quantitation Limit (ug/sample)	200	
Sample Volume (dscf)	106	
Actual POHC Feed/Spiking (lb/hr)	4	**133**
Analytical Safety Factor	10	
Fraction of Sample Extract for POHC Analysis	0.33	
POHC Background Concentration in Stack Gas (ug/l)	0	
POHC Contamination in Sample Train (ug/sample)	0	
Minimum Emissions and Feed/Spiking Required to Demonstrate Regulatory DRE		
% DRE (Regulatory Limit)	99.9999	
Stack Emission Rate Required for Detection (lb/hr)	3.75E-08	
Min. Stack Conc. to Demonstrate DRE (ug/dscf)	5.67E-04	
Min. Stack Conc. to Demonstrate DRE (ppbvds)	0.013	
Min. Feed/Spiking Rate to Demonstrate DRE (lb/hr)	0.0375	**1.2**
Feed/Spiking Rate With Analytical Safety Factor Applied (lb/hr)	0.375	**12**
Minimum Emissions and Feed/Spiking Required to Demonstrate Expected DRE		
% DRE (Expected Performance)	99.99999	
Stack Emission Rate Required for Detection (lb/hr)	3.75E-08	
Min. Stack Conc. to Demonstrate DRE (ug/dscf)	5.67E-04	
Min. Stack Conc. to Demonstrate DRE (ppbvds)	0.013	
Min. Feed/Spiking Rate to Demonstrate DRE (lb/hr)	0.3747	**12.5**
Feed/Spiking Rate With Analytical Safety Factor Applied (lb/hr)	3.747	**125**
Potential Emissions and DRE Demonstration Capability at Actual Feed/Spiking Rate		
Feed/Spiking Rate (lb/hr)	4	
POHC Emission at Regulatory DRE (lb/hr)	4.00E-06	
POHC in Stack Gas at Regulatory DRE (ug/dscf)	6.05E-02	
POHC in Stack Gas at Regulatory DRE (ppbvds)	0.4565	
POHC Emissions at Expected DRE (lb/hr)	4.00E-07	
POHC in Stack Gas at Expected DRE (ug/dscf)	6.05E-03	
Train Loading at Regulatory DRE (ug/train)	6.4	
Train Loading at Expected DRE (ug/train)	0.6	
Max. DRE Demonstrated at Feed/Spiking Rate (%)	99.99999906	

Table 7 Continued

Impact of Sample/Combustion Gas PICs and Background POHC Concentration

Emissions at Regulatory DRE from Actual Spiking (lb/hr)	4.00E-06
Emissions Equivalent from PICs/Background (lb/hr)	0.00E+00
Apparent Total Emissions w/PICs & Background (lb/hr)	4.00E-06
Apparent DRE at Reg. DRE w/PICs & Background (%)	99.9999
Added Sample Train Loading from PICs/Background (ug)	0.00
DRE Required to Counter PICs/Background (%)	99.9999

6.0 CONTINUED OPERATIONS

The treated soil stockpile has been sized to hold five days worth of treated material which will allow for reasonable turnaround times on the treated soil samples. The treated soil stockpiles will be separated using concrete barriers. ECC shall reprocess retreat and reanalyze soils that do not meet the treatment criteria indicated in Table 4. All sampling and analysis of the treated soil will be done in compliance with the Sampling and Analysis Plan and the Quality Assurance Project Plan submitted with this document.

Treated soil that has been confirmed to meet the treatment standard will be stockpiled in a common pile. Final disposition of soil will follow the excavation and backfill plan.

6. 1 Interim Operations and the Demonstration Test

ITD operations will consist of initial clean soil shakedown testing to verify correct installation of the system. Upon successful completion of clean testing (23 out of 24 hours of availability), ECC will immediately feed contaminated soils into the ITD system. The ITD limiting parameter is the dryer skin temperature.

Contaminated soil feed rates will be adjusted until the limiting parameter is reached. ECC will vary the soil discharge temperature starting at 900 degrees and reduced down until 750 degrees. At each temperature range, the soil feed rate will be determined. At each temperature range, a sample will be taken for PCB analysis (SW-846 Method 8080). Data will be gathered to form a curve in order to optimize the soil discharge treatment temperature. Treated soil piles will be kept to 50 yards at a maximum during the interim operating period. Treated soil will be analyzed to verify the remediation goals outlined in the Soil Erosion and Sediment Control Plan have been met.

Other variables, such as retention time, sweep etc. may be adjusted once basic temperature levels for treatment are known (fine-tuning).

Unlike incineration or direct desorption, the ITD emissions do not depend on the soil feed rate. Emissions directly correlate to non-condensable gas flow to the vent. The vent rate is dependent on the amount of TOC in the soil and in-leakage for the drier and other equipment. The in-leakage is the larger source of vent requirement. Since the in-leakage is fixed (a function of pressure driven crack velocity of the seals), vent quantity variations are derived from soil properties.

Upon development of process curves, ECC will identify the best choice of operating conditions to prove performance of the equipment. The preferred approach will be to use the most contaminated soil for the test, since exit (vent gas) is saturated in PCB vapor (still a very low value)

The selection of interim conditions for operations (while test results are under review) will be based on the following:

- Feed rate 75% of performance test value.

- Maintenance of condenser outlet temperature
- Mini test demonstration of PCB emission efficiency.

6. 2 Full Scale Operations

Prior to operation of the ITD system, it is necessary to verify that certain prerequisites to operation have been met. These include verification that the feed has been appropriately conditioned and characterized. In addition, adequate supply of fuel, makeup water, and cylinder gases must be verified as well as adequate storage space for the treated product. Feed materials not meeting the above parameters may not be processed without the approval of the Lead Thermal Operator.

6.2.1 Start-up, Operations, and Shutdown Procedures

The following normal start-up procedures ensure that the ITD system achieves targeted operational conditions before waste is introduced to the system. The major tasks involved in a normal start-up are summarized as follows:

- Verify that instrumentation, analyzers and control system, and air compressor are operational.
- Verify availability of utilities and fuel.
- Start scrubber re-circulation pump and the cooling tower pumps.
- Start cooling tower fans.
- Start I.D. and re-circulation blowers
- Starts kiln rotation.
- Start product handling equipment and double dump valves.
- Start Rotary Valves
- Start Bag-house Blower
- Start Bag-house Pulse Valves
- Start Inert Gas Generator
- Start dryer burners. Set the burners on low fire.
- Start bringing dryer shell operating temperatures up to startup set points, following heat up schedules.
- Start purging gas system with inert gas.
- Verify normal operation of APC vent system components.
- When shell temperatures are in normal startup range, verify that all permissives are satisfied for waste feed.
- Start waste feed, adjust burner outputs as necessary.
- Start filter press as necessary.

Normal shut down procedures are followed for any scheduled activity which requires that the thermal desorber be off line and accessible to maintenance personnel or for entry into equipment. Normal shutdown includes the following major activities:

- Shut down waste feed.

- Shut down burner outputs.
- Slow dryer rotation to crawl.
- Shut off filler press.
- Allow the dryer to cool until all zone control temperatures have reached their target shutdown temperatures. Shut off dryer air blower and stop dryer rotation.
- Stop product-handling components.
- Stop I.D. blower, re-circulation blower
- Stop refrigeration unit and cooling tower.
- Stop scrubber re-circulation pumps and cooling tower pumps.
- Stop water transfer pump and plant air compressor.

If the ITD operating conditions deviate from acceptable ranges, the automatic interlock system interrupts waste feed by stopping the waste feed conveyors. Waste feed stoppage is not the result of an emergency condition. Here, the system is stopping only waste feed to the unit as a temporary means to allow the operator to make corrections to a deviation from a predetermined normal condition. This condition is also referred to as a Ahot stand-by mode. Hot, in this sense, refers to the fact that the dryer burners are lit and maintaining normal operating temperatures throughout the system.

The operator’s actions following such an event are:

- Continue operation of the dryer burners to maintain normal operating product temperatures and stand-by shell temperatures. This action ensures complete treatment of any residual materials after waste feed shutoff.
- Continue normal operation of the gas train components.
- Locate and correct cause of problem.
- Return system to pre-startup operating conditions. Verify that all interlocks for waste feed have been satisfied.
- Restart waste feed per standard hot start-up instructions.

If, at any time, operations or maintenance personnel detect an abnormal operating condition which may result in a condition that may cause damage to the equipment, a total system shut down may be initiated by the lead operator.

An emergency shutdown is a major system upset in which the operator cannot bring the system down using normal procedures or will not be able maintain target operating parameters during the shutdown. In an emergency shutdown, all waste feed is immediately stopped. During an emergency shutdown, the radial stacking conveyor is swung into an empty bin or end dump to segregate solids that may not have been fully treated due to the emergency.

6.2.2 Data Collection and Inspections

Data collected by operating personnel on data sheets is a major information source used in running the ITD system. Data collection is essential for an understanding of the process and the capabilities of the equipment, as well as documenting critical operating parameters and atmospheric emissions. Data taking will be continuous through out the shift on a timely basis, not overly time-consuming, yet adequate to respond to changes in operating parameters. Sample forms are included as Appendix E.

Inspection are designed to ensure that all operating equipment, monitoring equipment, security devices, safety and emergency equipment, and structures function properly.

During inspections, the operator looks for malfunctions, deterioration, operator errors, or equipment failure that may cause or lead to the release of hazardous constituents to the environment or may represent a threat to human health. In addition to visual inspections, the data provided by instrumentation (e.g., changes in temperature or flow, pressure drop, position of limit switches, etc) will aid the operators in detecting leaks and unsafe conditions requiring further investigation.

The frequency of inspection will be at least as often as specified in federal, state, or local regulations and is based on the expected rate of deterioration for the equipment. Inspections are carried out often enough to identify problems in time to correct them before they cause harm to human health or the environment.

An inspection checklist will be provided for each inspection stating the items to be checked with a record of deficiencies. Completed checklists will be signed and dated by the inspector before they are filed for future reference. A copy of ITD inspection logs can be found in Appendix F. ECC logs will insure operating records are maintained in accordance with 40 CFR Part 264, Section 73 and 40 CFR Part 264, Section 74. The USADEH Contacting Officer or designated representative will be provided a copy of all inspection and operating logs.

Decisions made by operation and maintenance personnel will be reviewed by supervisors to insure that proper actions are taken. Supervisors who perform inspections will be responsible for taking whatever action is necessary to correct deficiencies.

6.2.3 Maintenance Plan and Standard Operating Procedures

The process will experience varying loads, and normal, as well as upset-related, outages. Under these conditions, it is imperative that maintenance be planned and scheduled and that preventive levels of maintenance be performed t maximize the systems availability.

Maintenance functions are grouped into three separate categories:

- Corrective Maintenance - repair/replacement of a problem piece of equipment that prevents its use until corrected.
- Preventive maintenance - inspection, modification, or servicing of a piece of equipment to extend its service life or to improve its efficiency.
- Routine Maintenance - includes regular housekeeping duties around the plant, periodic cleaning and painting of equipment facilities, and maintenance of the plant.

Environmental Chemical Corporation
99-1151 Iwaena St.
Aiea, HI 96701

Routine and preventive maintenance items are determined directly from the site characteristics and the recommended maintenance plans called out in the vendor equipment catalogs. Operations personnel will perform the bulk of the preventive maintenance requirements. Inspection and observation of the equipment are essential factors in prevention and are best performed by the people who are around the equipment the most. Similarly, recording observations and reporting maintenance requirements are standard functions of operators. To minimize disruptions, certain preventive measures will be incorporated in the daily and weekly operator inspection sheets. The sheets are intended to provide information on items that currently require maintenance attention. This information is forwarded immediately to the individual assigned to take the necessary action and correct the deficiency.

A central storeroom for spare parts, equipment, and supplies will be maintained. The storeroom shelving will be divided into bin areas in order to facilitate. Inventory control.

A program of tracking of critical spares will be adhered to minimize downtime. Parts that have long lead times, specialty parts, and any item which would incur unacceptable downtime will be kept in stock on site or in storage at a vendors warehouse. It is imperative that parts and equipment be available for a timely return to processing waste. An after hours phone list of critical vendors will be posted in the control room to allow access to spare parts not stocked on site.

Basic maintenance consideration for each piece of equipment or instrument is typically found in the manufacturer's catalog. Equipment catalogs and manuals have been assembled for all plant equipment and instrumentation and bound into volumes that will be available for use in the control room. If the manufacturer's information is considered inadequate, or other procedures or material is used to replace the manufacturer's data, these catalogs will be updated with the new information.

7.0 DECONTAMINATION PROCEDURES (1.3.1.6)

ECC will dismantle and decontaminate structures and equipment that have been utilized during the course of the Saipan Project. The structures and equipment located in the exclusion zone will be decontaminated.

The decontamination area will consist of the ITD pad area, particularly the CRZ pad located within the ITD pad. The concrete pad is bermed with sumps to handle liquid runoff. This sealed concrete pad provides secondary containment to capture decontamination fluids/wastes. All aqueous decontamination fluids / wastes will be treated through the ITD water treatment system before being discharged. All non-aqueous decontamination fluids / wastes will be contained and disposed of off-site. Note that in most cases, gross decontamination will be performed in-place before moving the equipment to the CRZ, where it will undergo final decontamination. The decontamination schedule was presented in detail earlier in section 2 of this plan.

Equipment decontamination using the “self-implementing decontamination procedures” described in 40 CFR 761.79(c). The self-implementing decontamination procedure requires a double wash/rinse as defined in 40 CFR 761.375. This procedure requires a first wash step with an industrial strength detergent or non-ionic surfactant solution. The second wash step requires the use of an organic solvent in which PCBs are soluble to a least 5% be weight.

1. Gross contamination of visible oil and solids will be removed in place.
2. Equipment will be removed and staged in the decontamination area. All external surfaces and accessible internal surfaces will be washed with a liquid detergent (i.e. Simple Green) and then rinsed with a high pressure, low volume washer.
3. High contamination contact areas will be washed with a hexane solvent, wipe up of solvent.
4. Low contact areas, exterior surfaces of equipment will be repainted as required.

After the equipment has been decontaminated the concrete pad will be cleaned using a high- pressure water / surfactant wash. A small area of the pad will house the remaining water treatment equipment (surge tank, pump, bag filters, and carbon cells). Because a sealant will be applied to the concrete pad during installation, the potential for surface penetration is minimal. The pad will be reused or broken up and stockpiled for disposal with the treated soil. A composite of the concrete pad will be sampled and analyzed. The material will be disposed of in accordance with the waste disposal plan, under separate cover. A composite sample of the material underneath the concrete pad will be sampled and analyzed to verify cross contamination from materials managed on the pad did not occur.

A decontamination certificate verifying the release criteria has been met will be issued by the site QA / QC officer or a duly appointed representative. A copy of all certificates of decontamination will be made available to the USADEH. All temporary utilities required for ITD operations will be removed from the site prior to final demobilization activities.

8.0 UTILITY REQUIREMENTS

Table 5 presented below shows average and peak system requirements for electricity, water, waste water disposal, and other fuels. All utilities for the ITD are available on CNMI.

Table 5
Average and Peak Utility Requirements

UTILITY	AVERAGE REQUIREMENT	PEAK REQUIREMENT
Electric Power	340 KW	560 KW
Raw water makeup	35 GPM	150 GPM
Fuel Oil	32 mm BTU/hr	40 mm BTU/hr
Water Disposal*	10 GPM	45 GPM

***** Water disposal is non-contact cooling water (average) or storm water (peak) only. All water will meet discharge requirements of CNMI and EPA regulations. No treated process water will be disposed; all treated process water will be recycled on to the treated soil.

9.0 NOISE ANALYSIS

The ITD system is scheduled for shakedown testing in Indio, California. However, a generator will supply electrical power to the system. Therefore, a noise analysis completed on the ECC ITD system would give inaccurate results. It should be noted that the containerized version of the system generates less noise than other systems. The results will be submitted in the same time frame as the demonstration test report, under separate cover.

10.0 BACKUP AND REDUNDANCY ANALYSIS

Table 10 outlines the ECC failure mode analysis for the ITD system. Controls have been incorporated and discussed in the previous sections. Refer to the P&IDs for details to match written descriptions.

Table 10
ECC Failure Mode Analysis

CONDITION	HOW DETECTED	ACTION
Drier Burner out of control	High exit gas temperature	shut down burner
Positive pressure drier – high	Differential pressure transmitter & visual dust emissions	Increase draft to APC scrubber, reduce soil feed rate
Positive pressure drier – high (2 minutes)	Differential pressure transmitter	AWFSO
Drier soil temperature – high	Discharge thermocouple	Reduce drier firing rate
Drier soil temperature – high	Discharge thermocouple	Burner shut down, continue inert purge
Dust from Soil Conditioner- high	Visual vent release	Increase bag-house vent fan speed.
Soil conditioner stall	Motor breaker trip	Feed stop, drier rotation stop, burner shut down, continue APC and inert purge. Clear obstruction and restart.
Soil conditioner high discharge temp, water failure.	Thermocouple and liquid flow switch.	drier rotation stop, burner shut down, continue APC and inert purge. Correct flow problem.
Loss of city water pressure	Pressure switch	burner shut down, system shut down.
Electrical Outage	System shut down	Battery operation of control system and computer, emergency condensing scrubber cooling using back up pump, start backup generator. Restart APC and orderly shut down of system.
Scrubber water failure	Flow switch and thermocouple	AWFSO, burner shut down, emergency condensing scrubber cooling using city water pressure, start back up spray pump.
Loss of ID Fan	Motor breaker trip	AWFSO, burner shut down, Reduce APC ventilation rate, Recirc fan to perform ventilation.
Loss of Recirc Fan	Motor breaker trip	AWFSO, burner shut down, Reduce APC ventilation rate, ID fan to perform ventilation.

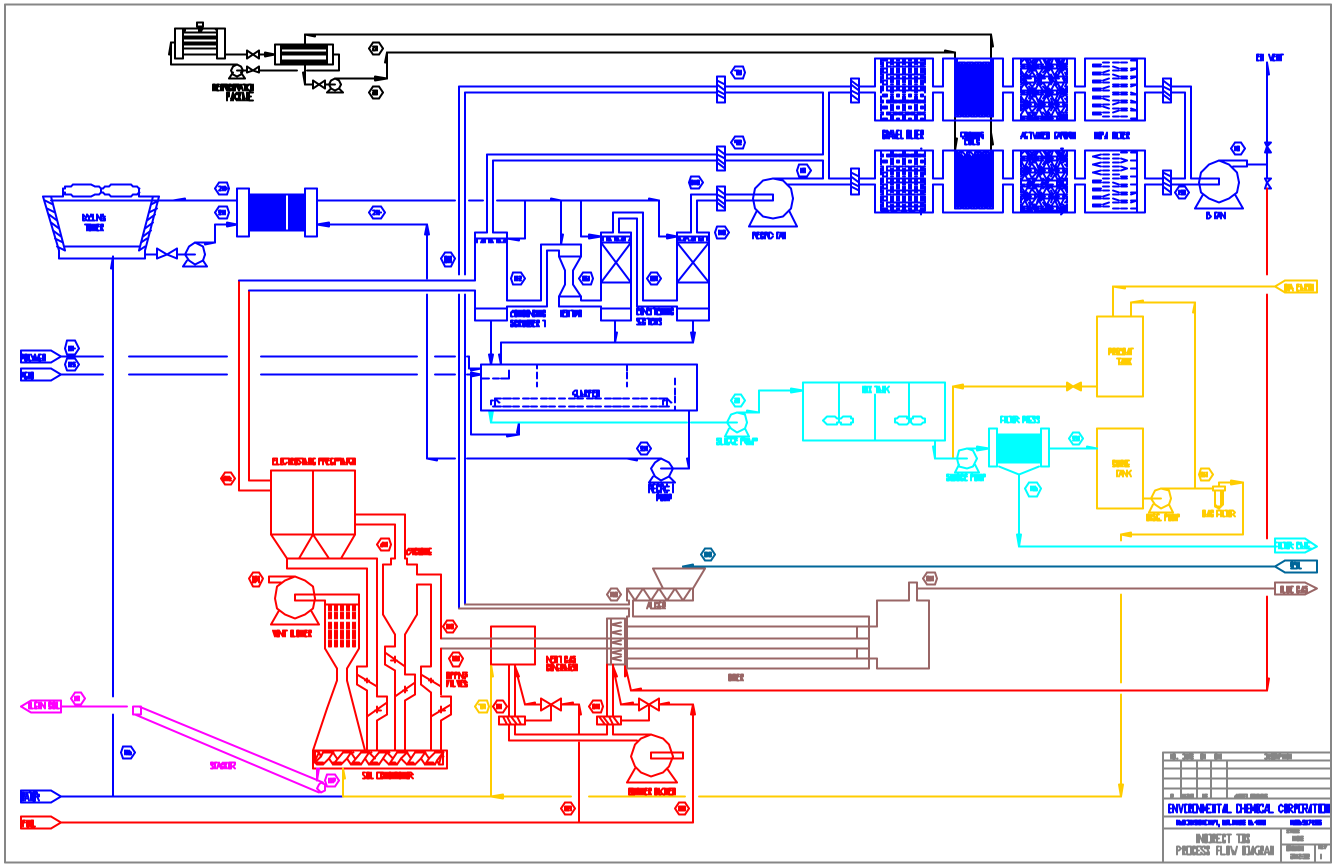
11.0 SITE PLAN AND EQUIPMENT ARRANGEMENTS

Drawing No. GA-1-01 shows the general site plan and location of the soil cells. Drawing No. GA-1-02 shows an enlarged view of the equipment area. Drawing GA-1-03 AITD Temporary Utility Locations shows the ITD pad and utility locations with respect to the site boundaries and the support zone.

See attached drawings.

12.0 PROCESS FLOW DIAGRAM

The ITD process flow diagram, IN FULL SIZE, drawing # 2-01 can be found in the list of drawings attached at the end of the Treatment Plan, Appendix A. The process flow diagram (PFD) shows all of the equipment components that are utilized in the ITD process. The PFD delineates the direction of all material stream flows with lines, arrows, and unique I.D. numbers. Drawing 2-03 provides flow sheets for average operating conditions for the process flow streams shown in the PFD. These tables include the temperature, flow rates, and composition of the flow streams, and provide the basis for the process design and equipment specifications.


ENVIRONMENTAL CHEMICAL CORPORATION
INDIRECT TDS
PROCESS FLOW DIAGRAM

13.0 PROCESS AND INSTRUMENT DIAGRAMS

Table 9 lists the four Process & Instrumentation Diagrams (P&IDs) for the ITD system which show all of the process equipment and the associated instrumentation, piping and valves, stacks, vents and dampers, and control equipment. ECC has not included process alarms, interlocks or AWFSOs on the P&IDs. These will be made available to the USACE in the form of a ladder diagram as soon as the ITD program for the process control is completed.

Table 9
Process and Instrumentation Diagrams

DRAWING NUMBER	DESCRIPTION
PI-3-01	DRYER
PI-3-02	SOIL CONDITIONER
PI-3-03	BURNER TRAIN
PI-3-04	PRECIPITATORS
PI-3-05	SCRUBBERS
PI-3-06	CLARIFIER CONTAINER
PI-3-07	FILTER PRESS
PI-3-08	COOLING TOWER

14.0 EQUIPMENT CAPACITIES

Table 11 lists the manufacturer, model #, material of construction (M.O.C.), dimensions, design capacity, and expected operational capacity for the dryer, material handling, air pollution control equipment, and waste water treatment equipment. The vendor manuals contain operating capacity and conditions for subsystem equipment, pumps, valves and other in-line devices, sizes of conveying devices (pipe, tubing conveyors, feeders, etc.), and number of parallel components or lines (Appendix A).

Table 11
ITD Equipment Manufacturers, Capacities, Materials of Construction and Dimensions

Component	Manufacturer / Model #	Material of Construction	Dimensions	Design Capacity / Expected Operational Capacity
Mass Flow Feeder	JC Steel/ 88E	Frame - C.S.	Length – 127” Width – 71 ¼”	50 tph / 10-20 tph
Dryer	Tarmac / N.A.	Frame: C.S. 7' Outer shell - S.S. 5' Inner shell - S.S. type 310 3' Inner shell - S.S. type 310	Length - 45' Width - 12' Height - 20'	50tph / 10-20 tph
Inert Gas Generator	Custom/ N.A.	Vessel - C.S.	Length – 8’ Height - 3'	1,000 acfm / 500 -700 acfm
Dryer Tipping Valves	BGRS / RM2-16HT	Housing - Stainless Flaps / Seats - Stainless	12" square x 3'-6” high	50 tph / 10-20 tph
Soil Conditioner	Martin/ N.A.	Housing - C.S. Auger - AR350 Steel	Diam. - 18" Length - 19'	50 tph / 10-20 tph
Radial Stacker	Ranger Ironworks/ N.A.	Frame - C.S. Belt - Rubber	Length - 60' Width - 5' 18^{O} incline Belt - 30"	50 tph / 10-20 tph
Cyclone	Allen-Sherman-Hoff’s/ 9VC-10T	Hopper - C.S. Tubes - C.S.	Length - 3' 8" Width - 5' 6" Height - 6' 6"	10,000 acfm / 4,000 - 7,000 acfm
Rotary Valve	Plattco / S4-0622	Housing - Ni-Res alloy Flaps / Seats - Chrome plated	6" square x 2' high	5 tph / 1-2 tph
Condensing Scrubber #1	Custom /	Shell - C.S. Supports - A-36 C.S.	Length – 5’-9” Width – 3’-0” Height – 8’-3”	10,000 acfm / 4,000 - 7,000 acfm
Precipitator	A.V.C. Specialists	Shell - C.S. Interior – S.S. (2) Sections	Length – 12’-0” Width – 8’-0” Height – 14’-0”	10,000 acfm/
Spray Tower	Custom /	Shell - A-36 C.S.	Length – 6’-0” Width – 3’-0” Height – 8’-3”	10,000 acfm / 4,000 - 7,000 acfm
Recirc. Blower	New York / 2110S	Housing - C.S. Impeller - C.S.	Length - 3'-0” Width – 3’-6” Height - 4'-1”	3,600 acfm / 2,000 - 2,300 acfm
Gravel Filter	Custom Mechanical / N.A.	Housing - C.S.	Length – 2’-0” Width – 3’-0” Height – 3’-9”	3,600 acfm / 2,000 - 2,300 acfm
Vapor phase Carbon	Custom Mechanical/ N.A.	Housing - C.S.	Length – 2’-0” Width – 3’-0” Height – 4’-1”	1,000 acfm / 500 - 700 acfm
HEPA Filter	Delta Air/ N.A.	Housing – C.S	Length - 4' Width - 2' Height - 6'	1,000 acfm / 500 - 700 acfm
I.D. Blower	New York / 2206A	Housing - C.S. Impeller - Aluminum	Length – 2’-6” Width - 3'	1,000 acfm / 500 - 700 acfm

			Height - 4'	

Table 11 (Continued)

Component	Manufacturer / Model #	Material of Construction	Dimensions	Design Capacity / Expected Operational Capacity
Cooling Towers	Marley / Aqua tower 4800	Housing – Galv. Steel.	Length – 33' Width –6'7" Height – 7'11"	800 gpm / 600 - 700 gpm
Recirc 1 Exchanger	ITT Standard / PF42	Plate Material - S.S. type 304	Length - 6' Width - 26" Height - 6'	600 gpm / 400 - 500 gpm
Dryer Blower	Hauk/ N.A.	All fiberglass, and carbon steel	5' cube	58,000 cfm at 20 psi
Refrigeration System	Lennox /	Frame - C.S. Coil - Copper Exchanger - C.S.	Length - 2' Width - 1' Height - 3'	20 tons / 30 tons
Clarifier	Custom / N.A.	Vessel - C.S. Drag Chain - C.S.	Vessel 9'-6" x 8' x 35'	600 gpm / 400 - 500 gpm
Filter press	Netzsch / 500/LP/IV	Frame - C.S. Plates - Polypropylene	Frame - 5' x 5' x 40' Plates - 1200 mm x 1200 mm	100 gpm / 10-30 gpm
Precoat Tank	Wichita Tank / Std. 500 barrel	Vessel - A-36 C.S.	Length - 5' Width - 8' Height - 12'	2,300 gal / 2,300 gal
Filtrate Tank	Custom / N.A.	Vessel - A-36 C.S.	Length - 38' Width - 8' Height – 9'-6"	22,000 gal / 22,000 gal
Bag filter Housings	Harvard/ N.A.	Vessel - C.S.	Diam. - 20" Height - 3'	100 gpm / 10-30 gpm
Air Compressor	Quincy / QST4DACA32	Tank - C.S.	Length - 6' Width - 3' Height - 6'	150 acfm / 50 - 100 acfm
Baghouse	Custom	Carbon Steel and Fiberglass Bags, Pulse Jet	Length – 4' Width – 8' Height – 20'	3000 acfm
Baghouse Blower	New York 2210S	Carbon Steel	Length – 5'-0" Width – 3'-0" Height – 4'-0"	3500 acfm / 3200 acfm
Emergency Generator	Rented (off the shelf component)	Frame Trane- C.S.	Length - 8' Width - 6' Height - 6'	50 kW/ 15-25 kW
Cooling Tower Pump	Gusher Pump/ Model PCL 4x6 10SEH-CC-A	Cast Iron w. Mechanical Seal	4" x 6" 5'-0" Long	800 gpm @ 60' TDH 20 H.P. TEFC 460 V./60 Hz./3 PH.
Recirculating Water Pump	Gusher Pump/ Model PCL 4x6 13SEH-CC-A	Cast Iron w. Packed Stuffing Box	4" x 6" 5'-0" Long	600 gpm @ 160' TDH 40 H.P. TEFC 460 V./60 Hz./ 3 PH

Table 11 (Continued)

Component	Manufacturer / Model #	Material of Construction	Dimensions	Design Capacity / Expected Operational Capacity
Emergency Cooling Water	Gusher Pump/ Model PCL 4x3 10SE7071MA	Cast Iron w. Mech. Seal	3" x 4" 4'-0" Long	200 gpm @ 74' TDH 7.5 H.P. TEFC 460 V./60 Hz/3 PH.
Glycol Pump	Gusher Pump/ Model 11019CIH PF42	Cast Iron w. Mech. Seal	1 ½ x 2" 18" Long	50 gpm @ 81' TDH 3 H.P. TEFC 460 V./60 Hz./ 3 PH
Sludge Pump	Blagdon Model 40	Ductile Iron	2" x 2" 18" x 23"	100 gpm @ 230' TDH 175 scfm

Attached (Appendix A) are copies of the manufacturers' operating manuals, drawings, and instructions for all ITD equipment and instrumentation. Only one manual for common instruments is included.

15.0 DATA INSTRUCTIONS

ECC's data management system includes data collection, averaging and storage of all analog data points from the PLC. ECC has programmed AIMAX software (by TA Engineering) to gather, alarm and historically store the data points. AIMAX database is a custom database with a unique scheme format that can only be accessed by AIMAX. This database allows real time historical trends to be viewed.

AIMAX does have a utility to convert historical trend information to a comma delineated data file (PRN). The file can be managed with any data management program such as Microsoft Excel or Access. The top row of the file contains the descriptors of each column. The first column contains the date and time for all records to the right. The records can contain a maximum of 16 data points, and can be saved on a shift, daily, weekly or monthly basis. Data points can be configured for averages, high, or low values for the averaging period.

Generally, regulatory points are recorded every 15 minutes. Loss of the data during the averaging period yields an error for the period. Loss of data can result during PLC communication losses. Data continuously monitored is described in section 5. ECC will provide electronic copies of all data, converted through AIMAX to PRN format via email.

16.0 PERMIT APPLICATION

All substantive standards and requirements of applicable environmental laws and regulations will be met.

Proposed measurement standards and model results are attached as an appendix. Source test will be conducted in accordance with a submitted source test plan. All test methods for the process source test shall be EPA protocol methods. See table 4.1.

17.0 INTERIM OPERATION AND DEMONSTRATION TEST REPORT

ECC will submit reports containing the results of interim operation and demonstration test to the Contracting Officer or designated representative within 10 days of receipt of results. The reports will contain the following at a minimum:

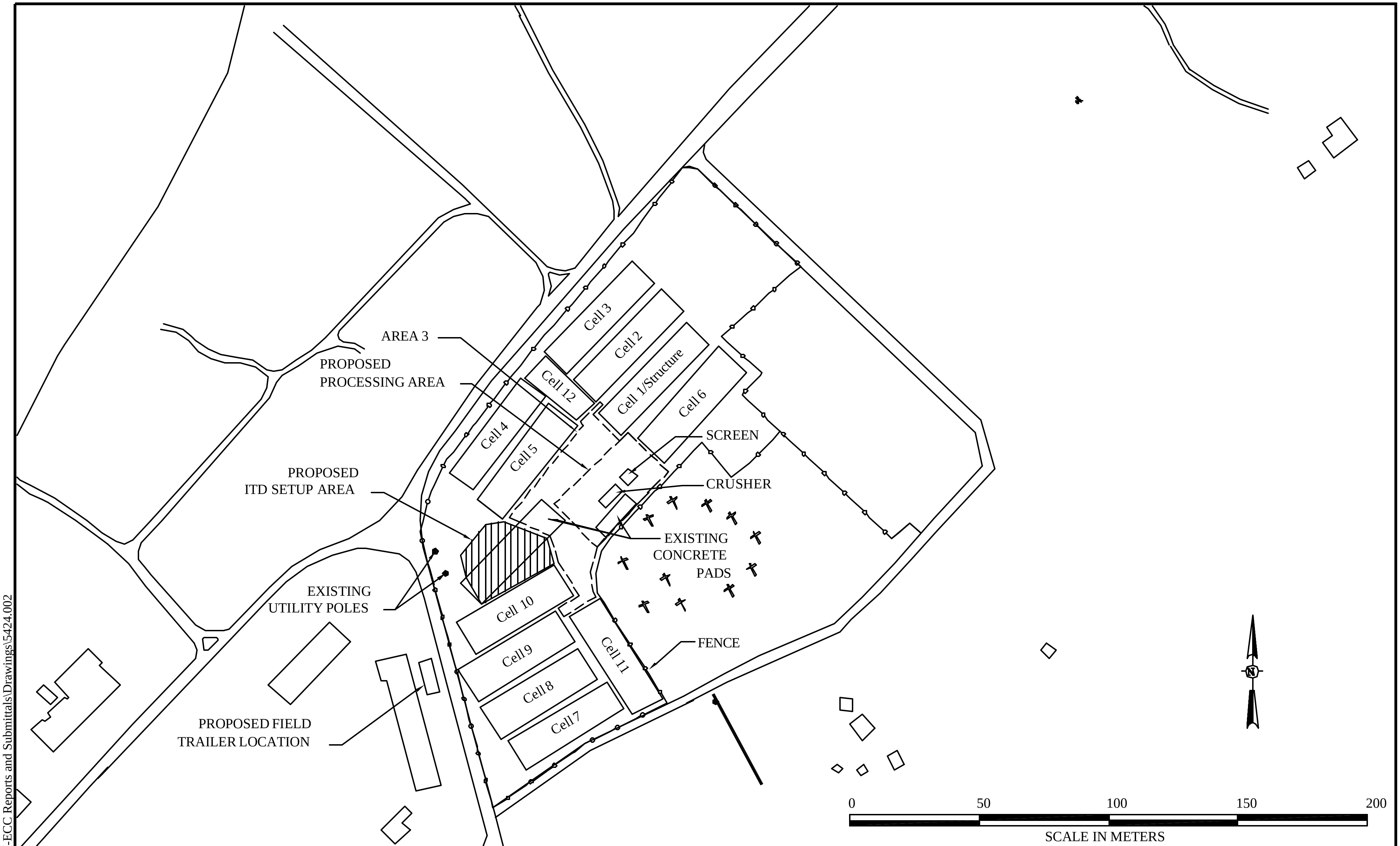
(a) Operator logs for the ITD operations during the interim and demonstration test periods
(b) Treated soil sample results for all contaminated material processed during these periods
(c) Results from all regulatory testing required during these periods
(d) Total tons treated through the ITD system during these periods as measured by the transfer conveyer weigh belt
(e) All electronic files of the continuously monitored and recorded parameters during these periods as outlined previously in Section 5 of this plan.
(f) Discussion of events during these periods pertaining to ITD operations.

18.0 OPERATING RECORDS

To be provided later.

FIGURES

N:\users\Draftng_share\Projects\H-ECC Reports and Submittals\Drawings\5424.002

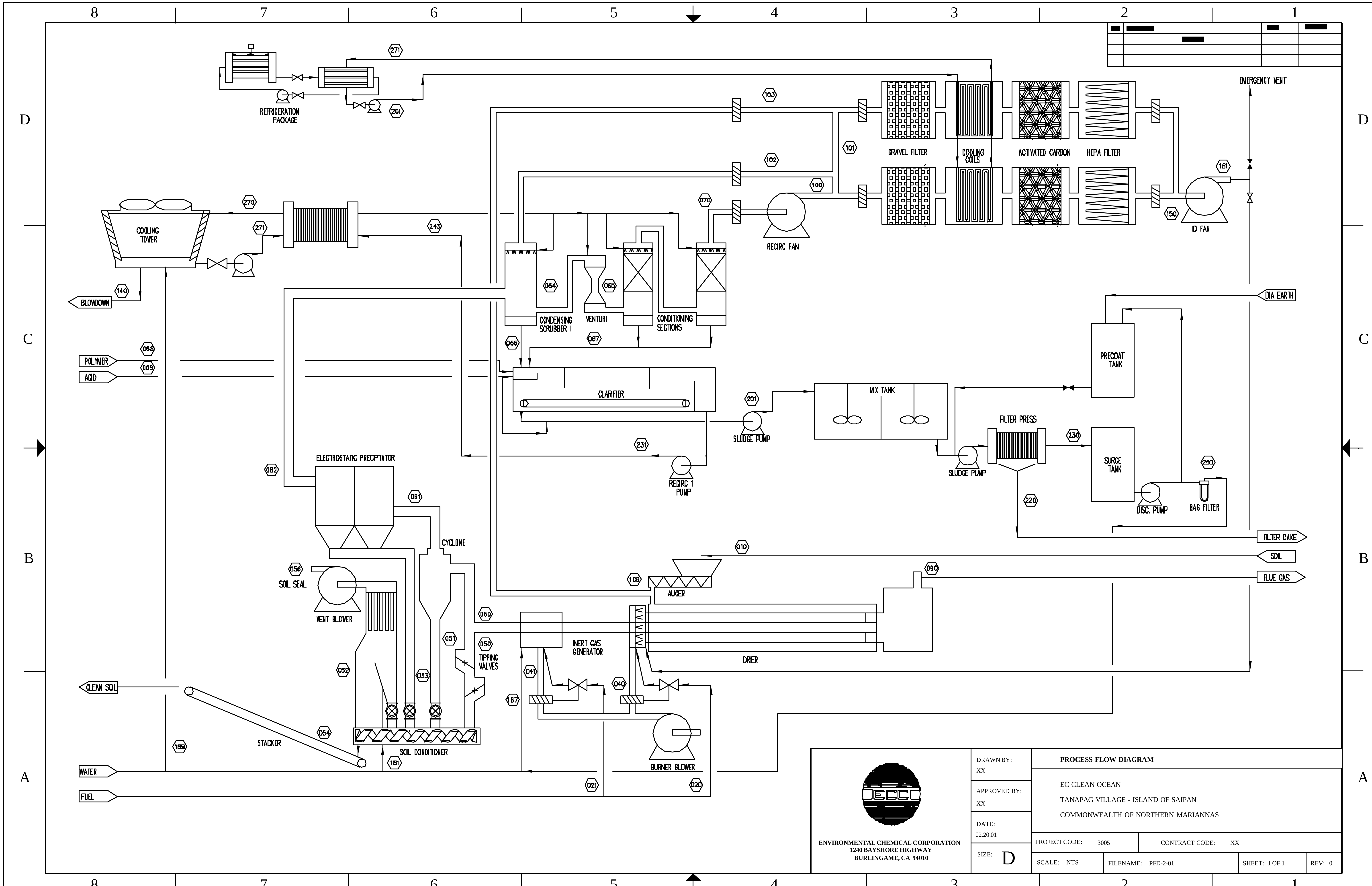


Environmental Chemical Corporation

Figure 1
Excavation, Soil Staging, and Layout

Phase IV, Tanapag Village
Island of Saipan, Commonwealth of the Northern Mariana Islands

Appendix A
Process Flow Sheet and Flow Values


EMERGENCY VENT
REFRIGERATION PACKAGE
GRAVEL FILTER
COOLING COILS
ACTIVATED CARBON
HEPA FILTER
ID FAN
RECIRC FAN
COOLING TOWER
BLOWDOWN
POLYMER
ACID
CONDENSING SCRUBBER I
VENTURI
CONDITIONING SECTIONS
CLARIFIER
SLUDGE PUMP
MIX TANK
PRECOAT TANK
DIA EARTH
FILTER PRESS
SURGE TANK
DISC. PUMP
BAG FILTER
FILTER CAKE
SOIL
FLUE GAS
RECIRC 1 PUMP
ELECTROSTATIC PRECIPITATOR
CYCLONE
SOIL SEAL
VENT BLOWER
AUGER
DRIER
INERT GAS GENERATOR
TIPPING VALVES
BURNER BLOWER
SOIL CONDITIONER
STACKER
CLEAN SOIL
WATER
FUEL
271
281
103
102
101
100
161
150
070
270
243
064
065
066
087
068
069
201
230
231
250
220
082
081
010
090
056
106
060
051
050
052
153
041
040
187
054
181
189
021
020
ENVIRONMENTAL CHEMICAL CORPORATION
1240 BAYSHORE HIGHWAY
BURLINGAME, CA 94010
DRAWN BY: XX
APPROVED BY: XX
DATE: 02.20.01
SIZE: D
PROCESS FLOW DIAGRAM
EC CLEAN OCEAN
TANAPAG VILLAGE - ISLAND OF SAIPAN
COMMONWEALTH OF NORTHERN MARIANNAS
PROJECT CODE: 3005
CONTRACT CODE: XX
SCALE: NTS
FILENAME: PFD-2-01
SHEET: 1 OF 1
REV: 0

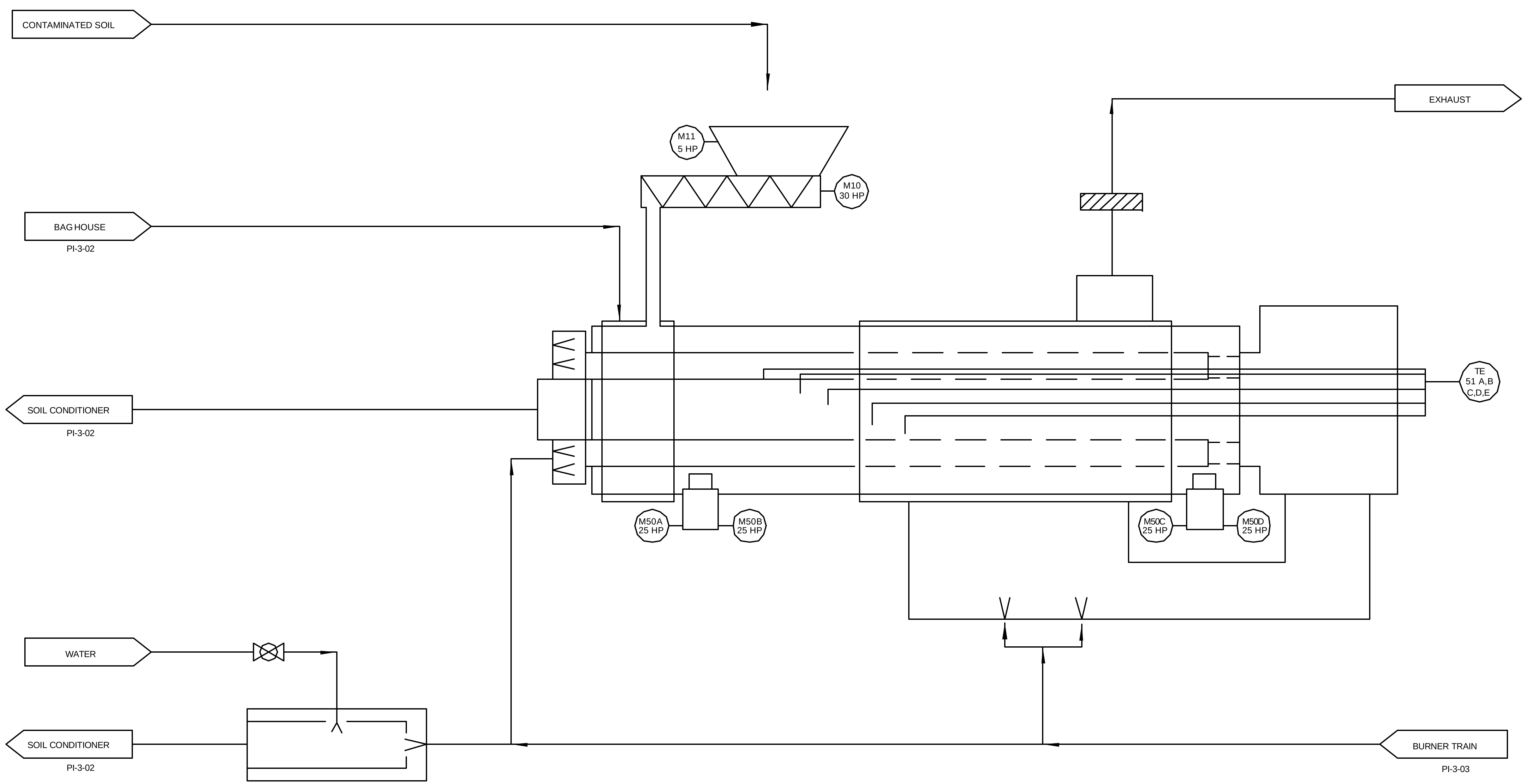
ITD FLOW SHEET VALUES
SAIPAN PROJECT
ENVIRONMENTAL CHEMICAL CORPORATION

STREAM	010	020	021	040	041	050	051	052	053	054	056	060	061	062	064	065	066	067	068	069	070	090
COMPONENT	SOIL - SCREENED	FUEL	IGG FUEL	PRIMARY AIR	IGG BURNER AIR	DRIER SOIL DISCH.	CYCLONE SOLID DISCH.	SOILD COND. VENT SOLIDS	PPT SOLIDS	SOIL CONDITIONER OUTLET	CONDITIONER VENT GAS	CYCLONE GAS INLET	CYCLONE GAS OUTLET	PPT GAS OUTLET	CON. SCRUBBER OUTLET	VENTURI OUTLET	COND. SCRUB. LIQUID	PACKED COLUMN LIQUID	POLYMER	ACID	PACKED OUTLET	BURNER OFF GAS
WEIGHT (#/HR)																			LATER	LATER		
TOTAL	28,000	1,442	56	24,130	930	15,680	4,704	2,240	1,814	27,798	3,588	13,969	9,265	7,451	8,676	7,599	243,674	31,594			7,284	25,572
SOLID INERT	22,400					15,680	4,704	2,240	1,814	22,198	1	6,720	2,016	202	605	30	1,411	578			27	22,829
GAS INERT		-		23,889	920						326	980	980	980	7,000	7,000					7,000	3
WATER	5,600			241	9					5,600	3,260	6,268	6,268	6,268	1,071	569	242,263	31,016			257	2,743
ORGANIC	-	1,442	56									-	-	-	-	-	-	-			-	
FLOW																						
ACFM				4,983	192						1,719	6,996	6,996	6,637	2,195	1,927					1,727	18,803
GPM																	485	62				
TEMPERATURE (DEG F)	90	60	60	90	90	900	900	250	850	140	275	1,000	1,000	925	140	120	120	120			95	1,200
COMPOSITION																						
% O2				21%	21%						1%	1%	1%	0	4%	4%					0	0
% N2				78%	78%						5%	8%	8%	0	77%	85%					1	1
% H2O				1%	1%						94%	91%	91%	1	19%	11%					0	0
% ORGANIC												0%	0%	-	0%	0%					-	-
ENERGY (BTU/HR)	72,800	27,399,089	1,000,000	158,830	6,119	3,048,192	914,458	106,400	352,719	891,968	3,423,401	9,321,589	8,407,131	7,634,056	1,295,159	706,778	7,111,973	906,057			389,102	9,270,684

ITD FLOW SHEET VALUES
SAIPAN PROJECT
ENVIRONMENTAL CHEMICAL CORPORATION

STREAM	100	101	102	103/6	150	151	181	187	189	190	201	220	230	232	250	260	261	270	271
COMPONENT	REFAN OUTLET	GAS TO FILTER	GAS RECIRC	SWEEP	HEPA FILTER OUTLET	STACK OUTLET	CONDITION WATER	IGG WATER	C.T MAKE UP	C.T. BLOWDOWN	SLUDGE TO MIX TANK	FILTER PRESS SOLIDS	FILTER PRESS DECANT	RECIRC 1 EX-INLET	DECANT TO CONDIT.	C.T OUTLET	SUPER COOL EX E.G.-IN	C.T INLET	SUPER COOL EX E.G.-OUT
WEIGHT (#/HR)																			
TOTAL	7,284	1,530	4,713	1,041	1,482	1,482	8,860	493	14,699	7,349	6,568	399	6,169	276,858	6,169	400,000	9,339	400,000	543,325
SOLID INERT	27	6	18	4	-	-					200	200	-	3,778					
GAS INERT	7,000	1,471	4,529	1,000	1,471	1,471													
WATER	257	54	166	37	11	11	8,860	493	14,699	7,349	6,368	200	6,169	273,080	6,169	400,000	9,339	400,000	543,325
ORGANIC	-	-	-		-	-					-	-	-	-					
FLOW						-													
ACFM	1,671	351	1,081	239	331	331													
GPM						-	18	1	29	15	13		12	546	12	800	19	800	1,087
TEMPERATURE (DEG F)	105	105	105	105	70	70	90	90	90	90	120	120	120	120	120	83	25	83	35
COMPOSITION						-													
% O2	0	0	0	0	0	0													
% N2	1	1	1	1	1	1													
% H2O	0	0	0	0	0	0													
% ORGANIC	-	-	-	-	-	-													
ENERGY (BTU/HR)	406,988	85,507	263,340	58,141	38,814	38,814	-				191,048	5,988	185,060	7,826,981	185,060			-	5,433,246

Appendix B
Process and Instrumentation Drawings

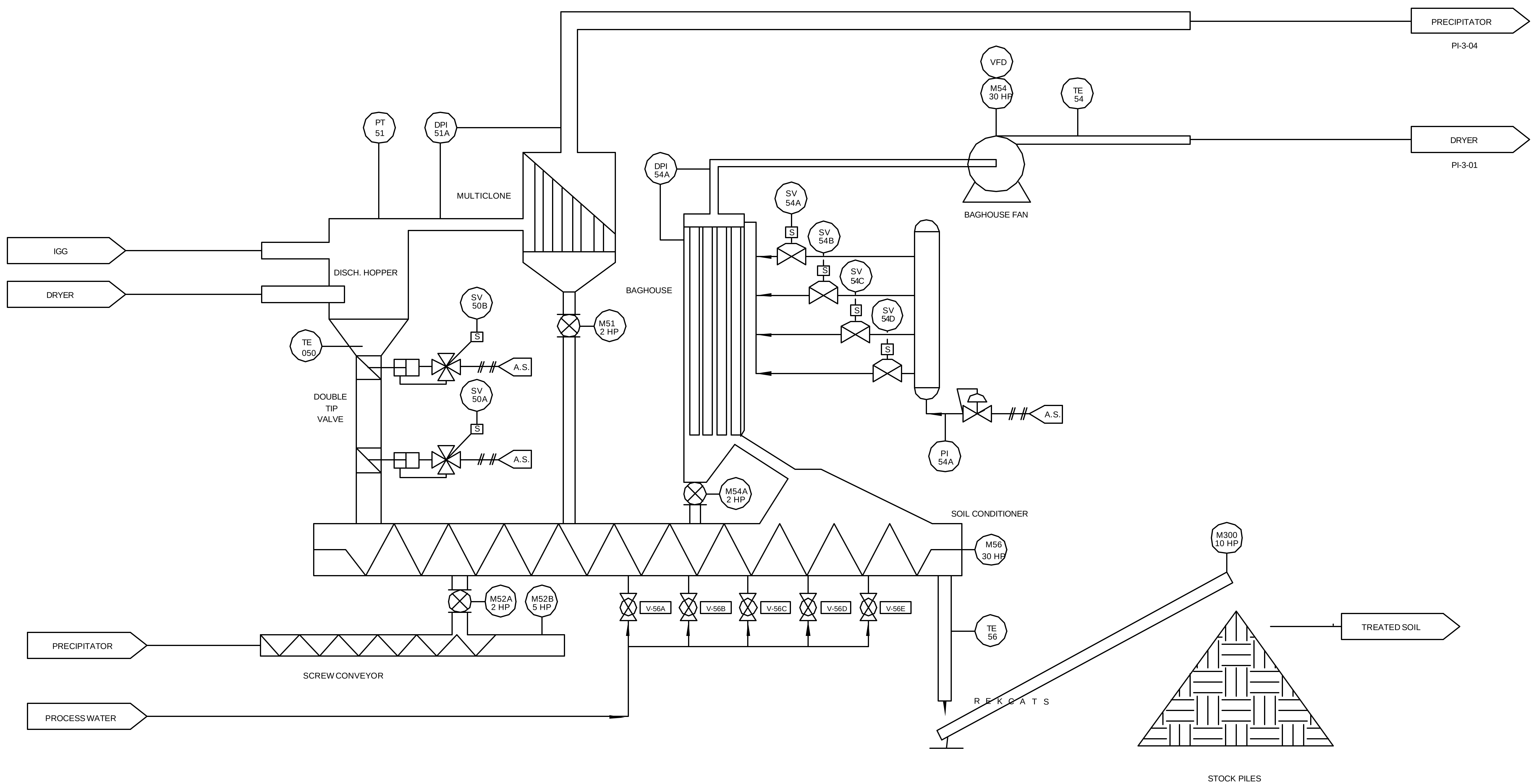


[redacted]

DRAWN BY: XX	P& ID - DRYER & INERT GAS GENERATOR	
APPROVED BY: A. BEAUDIN	EC CLEAN OCEAN TANAPAG VILLAGE - ISLAND OF SAIPAN COMMONWEALTH OF NORTHERN MARIANNAS	
DATE: 02.20.01	PROJECT CODE: 3005	CONTRACT CODE: XX
SIZE: D	SCALE: NTS	FILENAME: PI-3-02	SHEET: 1 OF 1	REV: 0

ENVIRONMENTAL CHEMICAL CORPORATION
1240 BAYSHORE HIGHWAY
BURLINGAME, CA 94010

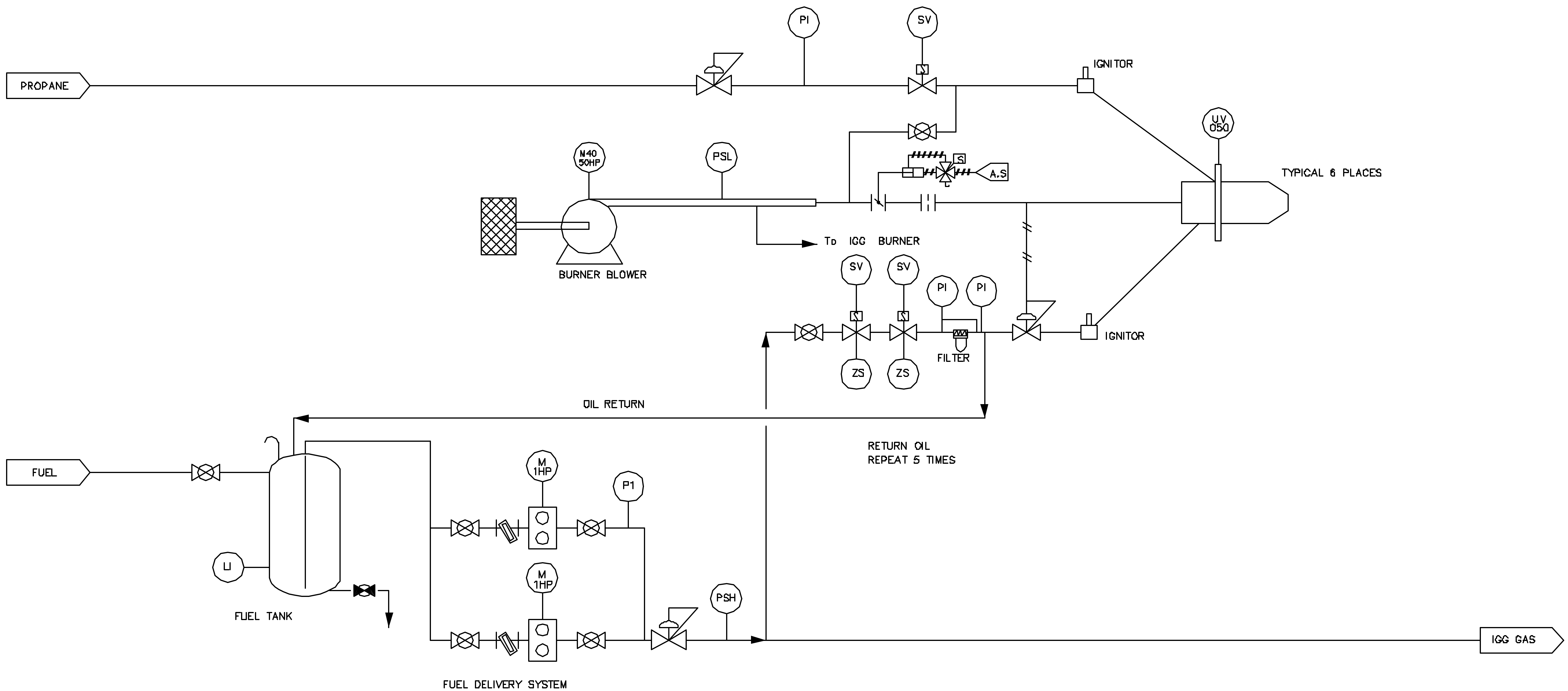
[redacted]



ENVIRONMENTAL CHEMICAL CORPORATION
1240 BAYSHORE HIGHWAY
BURLINGAME, CA 94010

DRAWN BY: XX	P& ID - SOIL CONDITIONER				
APPROVED BY: A. BEAUDIN	EC CLEAN OCEAN TANAPAG VILLAGE - ISLAND OF SAIPAN COMMONWEALTH OF NORTHERN MARIANNAS				
DATE: 02.20.01	PROJECT CODE: 3005		CONTRACT CODE: XX		
SIZE: D	SCALE: NTS	FILENAME: PI-3-02		SHEET: 1 OF 1	REV: 0

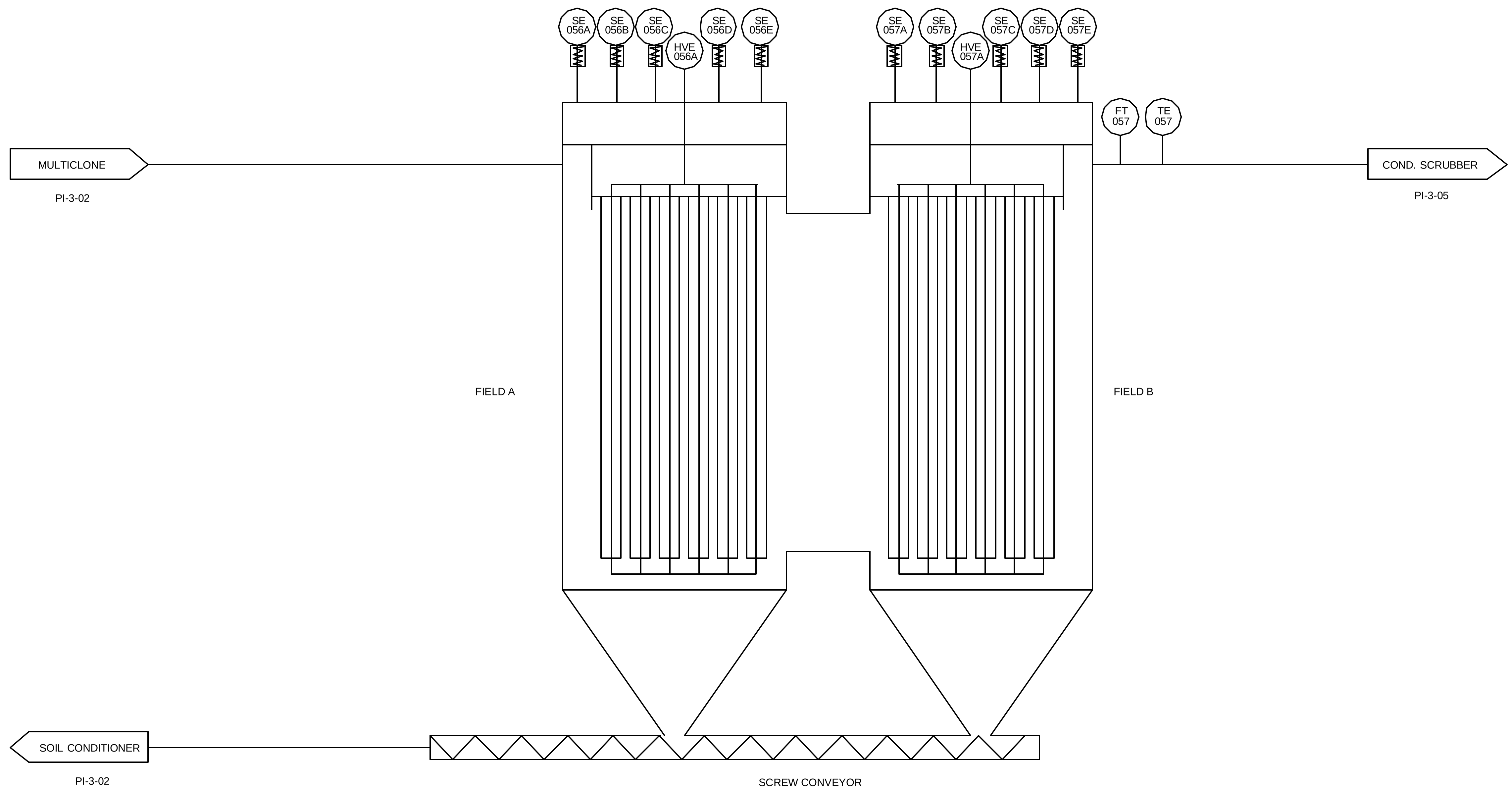
[redacted]



ENVIRONMENTAL CHEMICAL CORPORATION
1240 BAYSHORE HIGHWAY
BURLINGAME, CA 94010

DRAWN BY: XX	P& ID - BURNER TRAIN
APPROVED BY: A. BEAUDIN	EC CLEAN OCEAN TANAPAG VILLAGE - ISLAND OF SAIPAN COMMONWEALTH OF NORTHERN MARIANNAS
DATE: 02.20.01	PROJECT CODE: 3005 — CONTRACT CODE: XX
SIZE: D	SCALE: NTS — FILENAME: PI-3-03.DWG — SHEET: 1 OF 1 — REV: 0

[redacted]



ENVIRONMENTAL CHEMICAL CORPORATION
1240 BAYSHORE HIGHWAY
BURLINGAME, CA 94010

DRAWN BY: XX

APPROVED BY: A. BEAUDIN

DATE: 02.20.01

SIZE: D

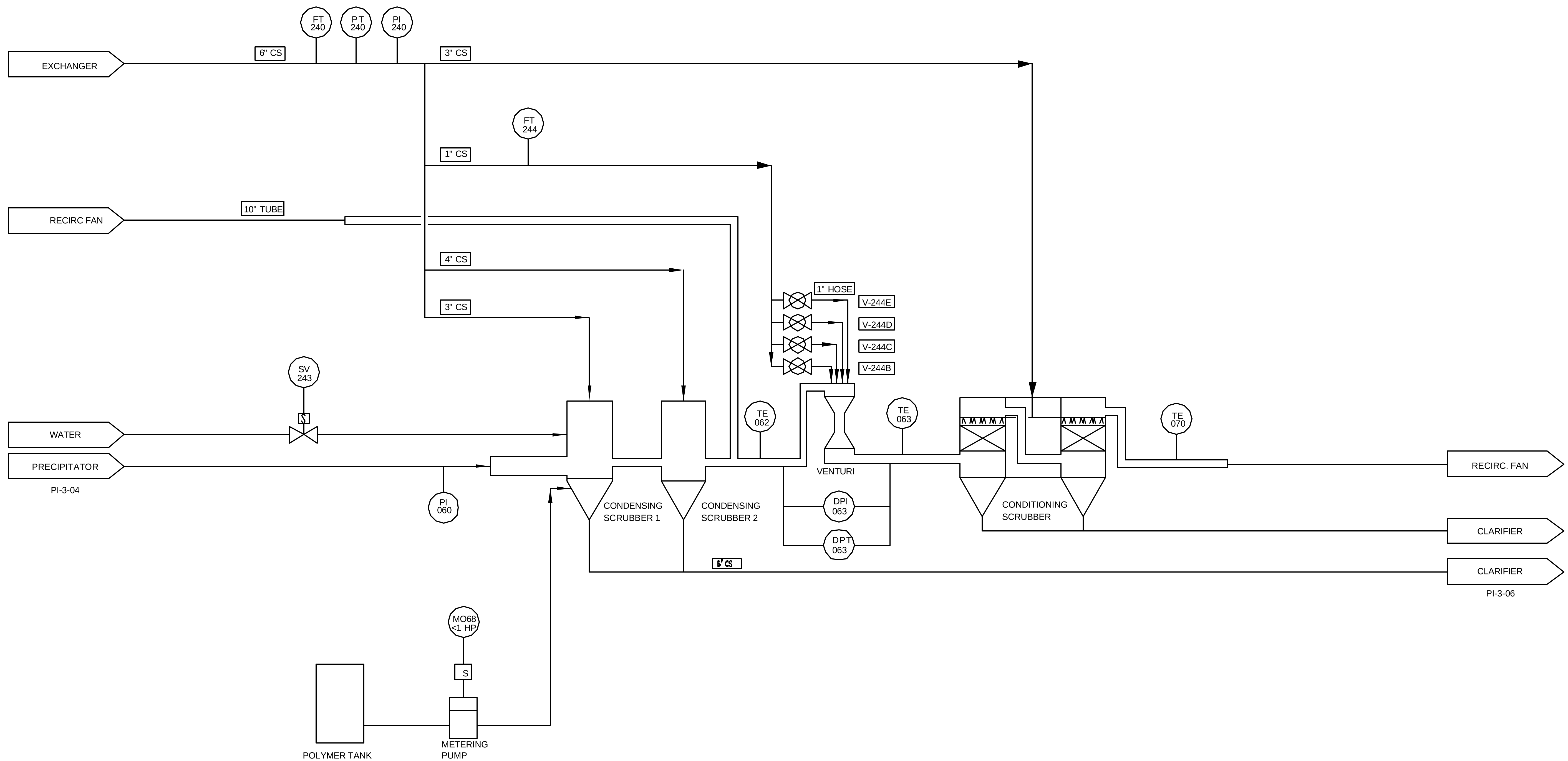
P& ID - PRECIPITATORS

EC CLEAN OCEAN
TANAPAG VILLAGE - ISLAND OF SAIPAN
COMMONWEALTH OF NORTHERN MARIANNAS

PROJECT CODE: 3005 | CONTRACT CODE: XX

SCALE: NTS | FILENAME: PI-3-04 | SHEET: 1 OF 1 | REV: 0

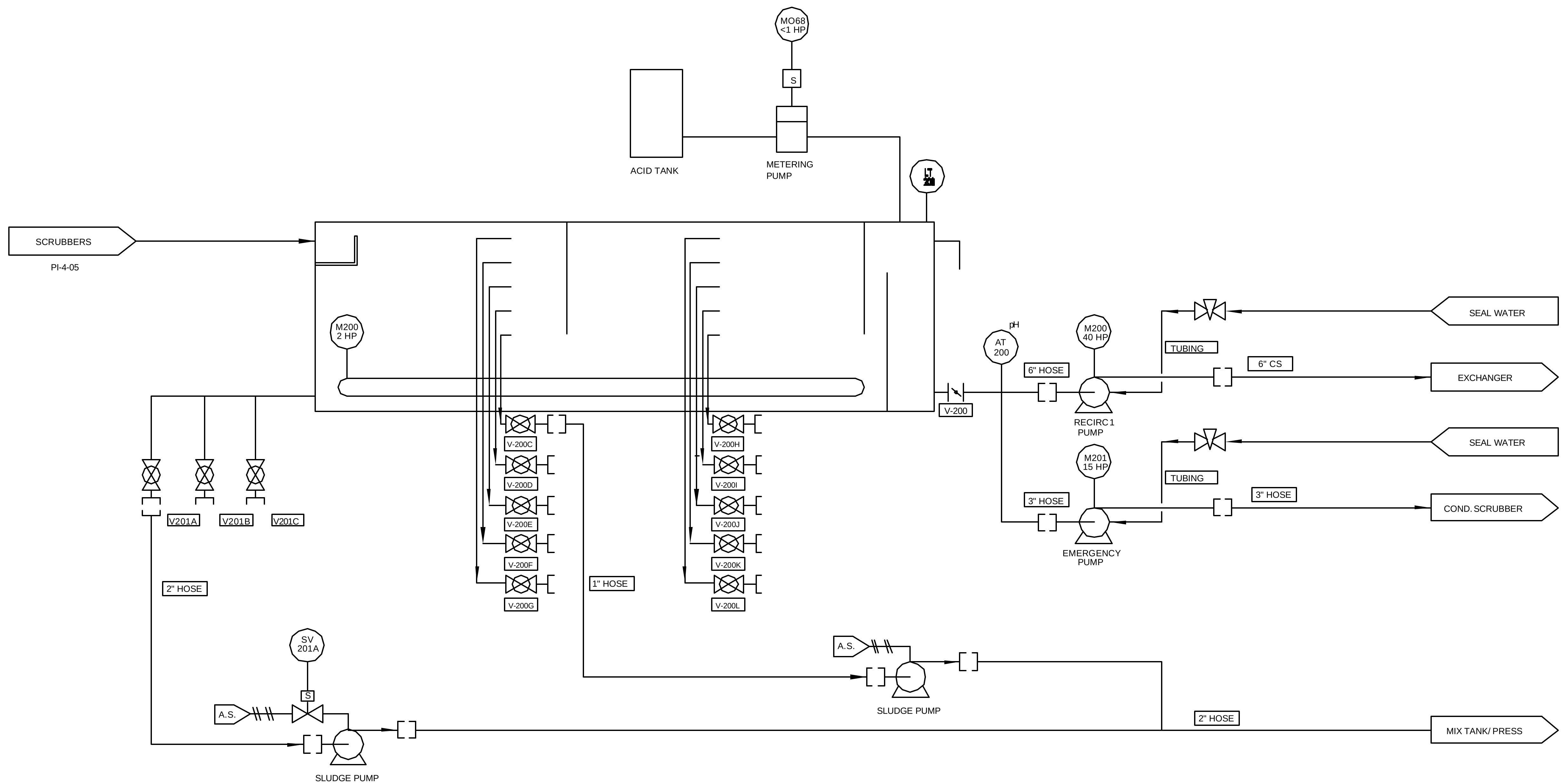
[redacted]



ENVIRONMENTAL CHEMICAL CORPORATION
1240 BAYSHORE HIGHWAY
BURLINGAME, CA 94010

DRAWN BY: XX	P& ID - SCRUBBERS	
APPROVED BY: A. BEAUDIN	EC CLEAN OCEAN TANAPAG VILLAGE - ISLAND OF SAIPAN COMMONWEALTH OF NORTHERN MARIANNAS	
DATE: 02.20.01	PROJECT CODE: 3005	CONTRACT CODE: XX
SIZE: D	SCALE: NTS	FILENAME: PI-3-05

SHEET: 1 OF 1 REV: 0

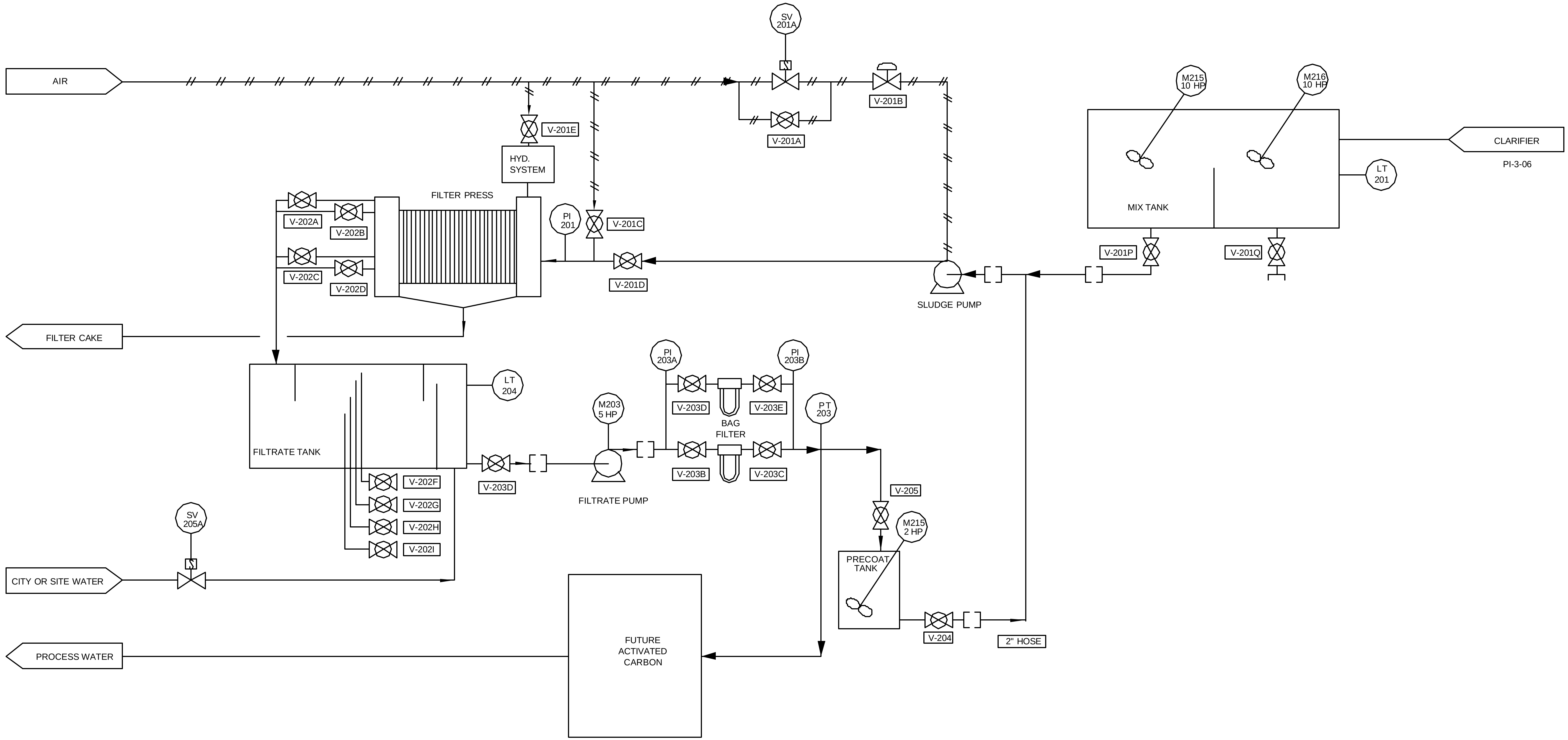


[redacted] [redacted] [redacted] [redacted]

[redacted]

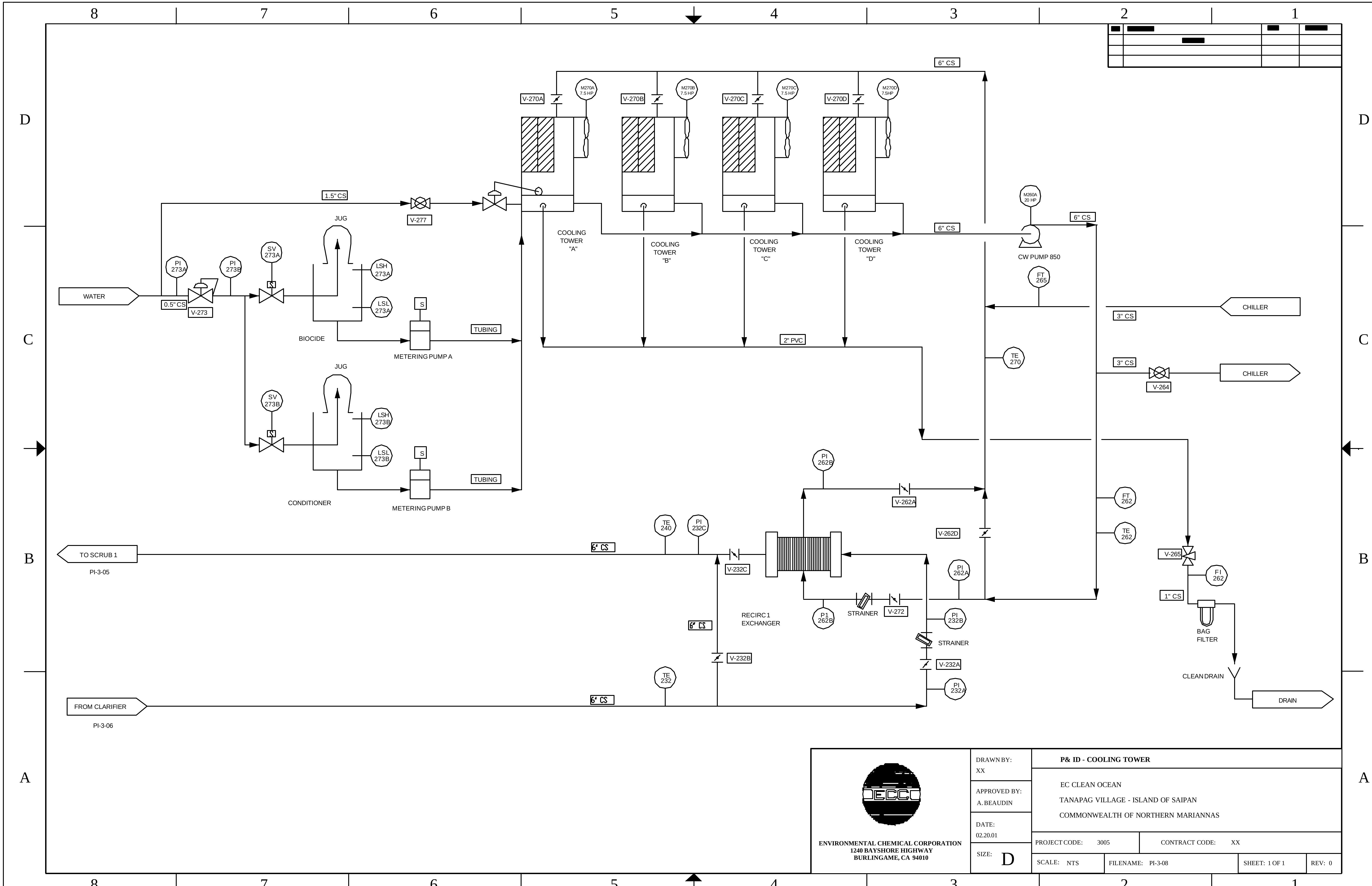
ENVIRONMENTAL CHEMICAL CORPORATION
1240 BAYSHORE HIGHWAY
BURLINGAME, CA 94010

DRAWN BY: XX	**P& ID - CLARIFIER CONTAINER**
APPROVED BY: A. BEAUDIN	EC CLEAN OCEAN TANAPAG VILLAGE - ISLAND OF SAIPAN COMMONWEALTH OF NORTHERN MARIANNAS
DATE: 02.20.01	PROJECT CODE: 3005 · CONTRACT CODE: XX
SIZE: D	SCALE: NTS · FILENAME: PI-3-06 · SHEET: 1 OF 1 · REV: 0



ENVIRONMENTAL CHEMICAL CORPORATION 1240 BAYSHORE HIGHWAY BURLINGAME, CA 94010	DRAWN BY: XX	P& ID - FILTER PRESS
	APPROVED BY: A. BEAUDIN	EC CLEAN OCEAN TANAPAG VILLAGE - ISLAND OF SAIPAN COMMONWEALTH OF NORTHERN MARIANNAS
	DATE: 02.20.01	PROJECT CODE: 3005 / CONTRACT CODE: XX
	SIZE: D	SCALE: NTS / FILENAME: PI-3-07 / SHEET: 1 OF 1 / REV: 0

[redacted]

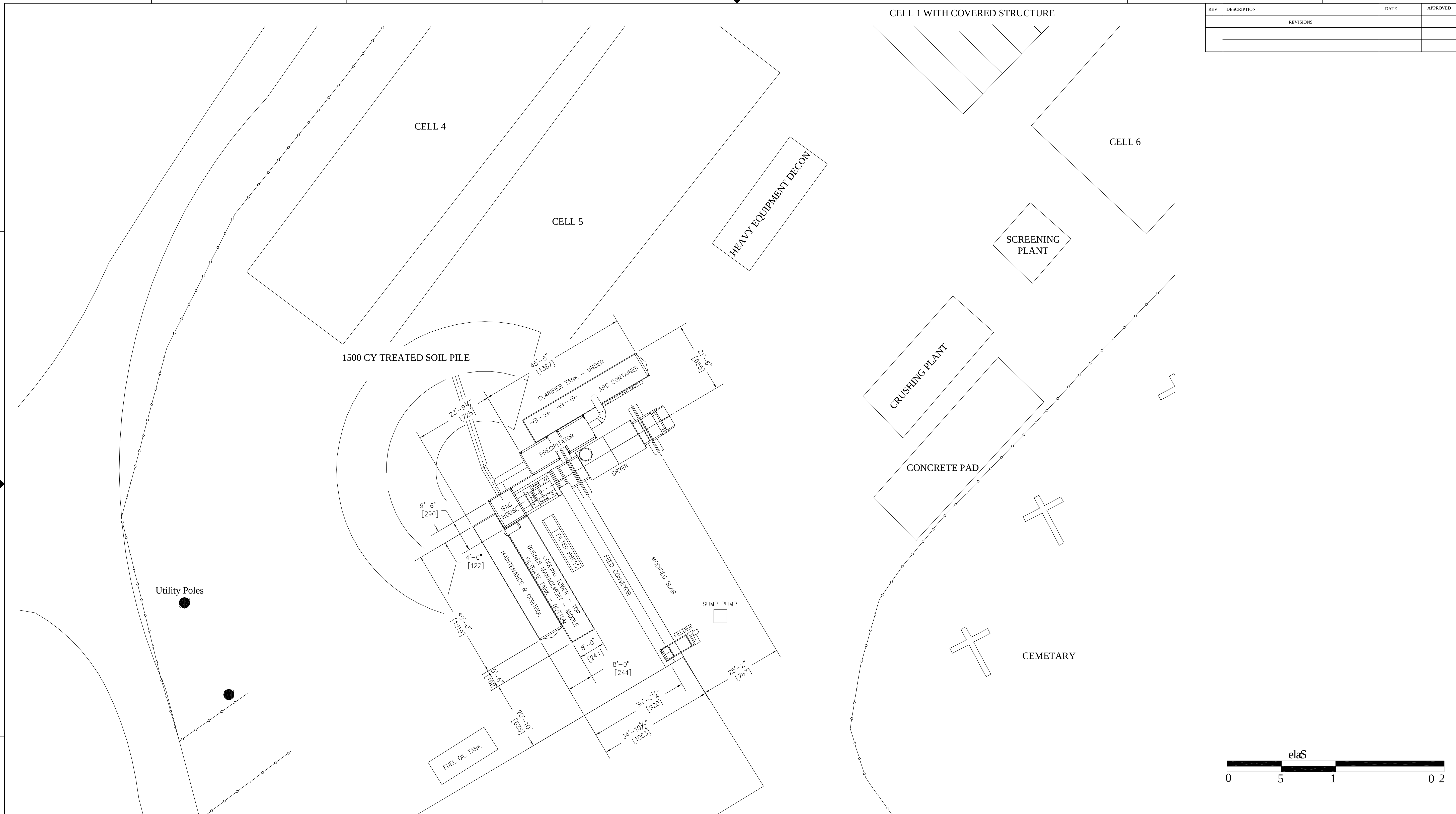


WATER
0.5" CS
V-273
PI 273A
PI 273B
SV 273A
SV 273B
JUG
LSH 273A
LSL 273A
LSH 273B
LSL 273B
BIOCIDE
CONDITIONER
S
METERING PUMP A
METERING PUMP B
TUBING
1.5" CS
V-277
COOLING TOWER "A"
COOLING TOWER "B"
COOLING TOWER "C"
COOLING TOWER "D"
V-270A
V-270B
V-270C
V-270D
M270A 7.5 HP
M270B 7.5 HP
M270C 7.5 HP
M270D 7.5HP
6" CS
2" PVC
M260A 20 HP
CW PUMP 850
FT 265
TE 270
3" CS
CHILLER
V-264
FT 262
TE 262
V-265
FI 262
1" CS
BAG FILTER
CLEAN DRAIN
DRAIN
PI 262B
V-262A
V-262D
PI 262A
V-272
STRAINER
PI 232B
V-232A
PI 232A
RECIRC 1 EXCHANGER
P1 262B
V-232C
V-232B
TE 240
PI 232C
TE 232
TO SCRUB 1
PI-3-05
FROM CLARIFIER
PI-3-06
ENVIRONMENTAL CHEMICAL CORPORATION
1240 BAYSHORE HIGHWAY
BURLINGAME, CA 94010
DRAWN BY: XX
APPROVED BY: A. BEAUDIN
DATE: 02.20.01
SIZE: D
P& ID - COOLING TOWER
EC CLEAN OCEAN
TANAPAG VILLAGE - ISLAND OF SAIPAN
COMMONWEALTH OF NORTHERN MARIANNAS
PROJECT CODE: 3005
CONTRACT CODE: XX
SCALE: NTS
FILENAME: PI-3-08
SHEET: 1 OF 1
REV: 0

Appendix C
General Arrangements

REV	DESCRIPTION	DATE	APPROVED
	REVISIONS		

ENVIRONMENTAL CHEMICAL CORPORATION 1240 BAYSHORE HIGHWAY BURLINGAME, CA 94010	DRAWN BY: XX	GA - SITE PLAN			
	APPROVED BY: A. BEAUDIN	EC CLEAN OCEAN TANAPAG VILLAGE - ISLAND OF SAIPAN COMMONWEALTH OF NORTHERN MARIANNAS			
	DATE: 02.20.01	PROJECT CODE: 3005	CONTRACT CODE: XX		
	SIZE: D	SCALE: NTS	FILENAME: GA-1-01	SHEET: 1 OF 1	REV: 0



REV	DESCRIPTION	DATE	APPROVED
	REVISIONS		

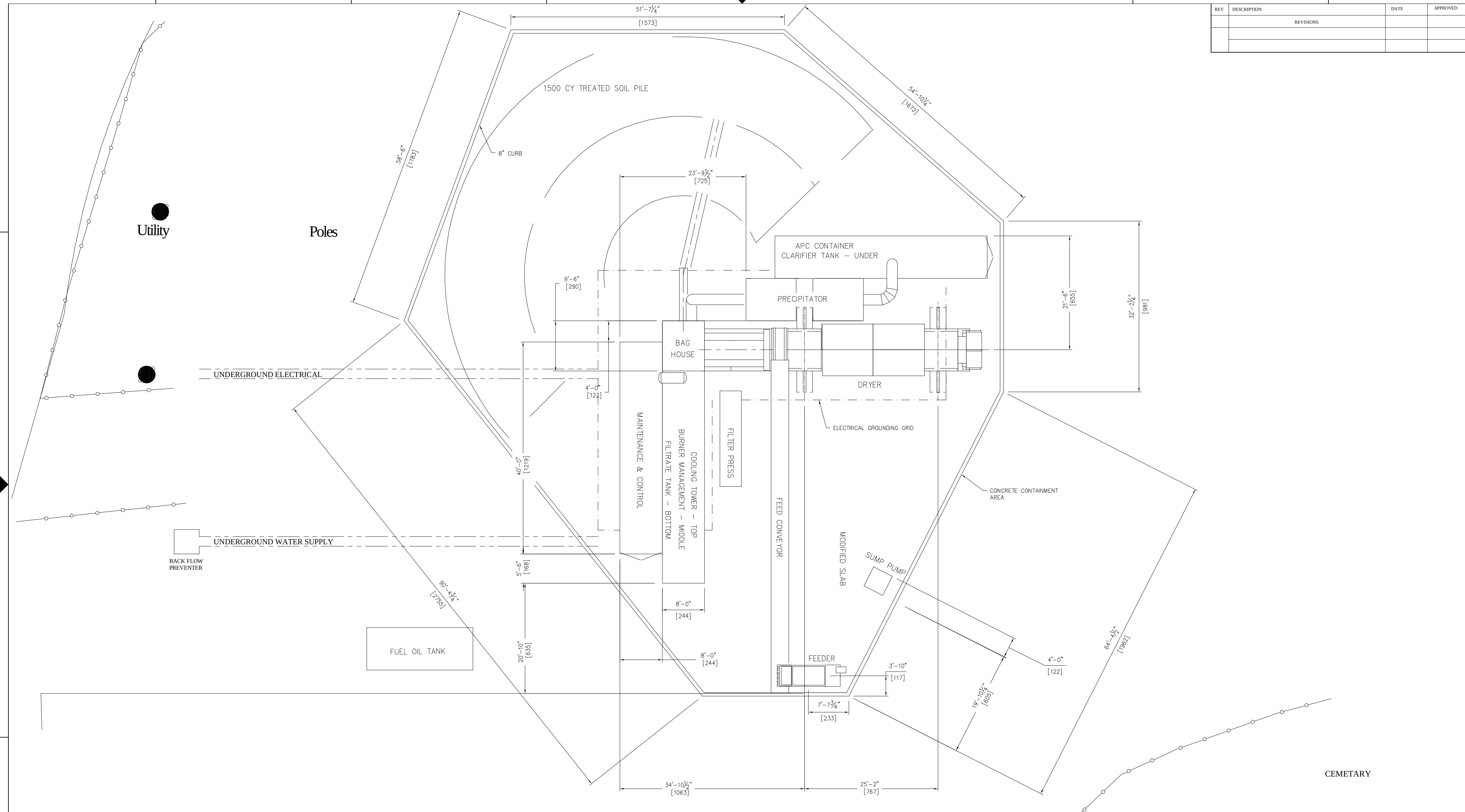
ENVIRONMENTAL CHEMICAL CORPORATION
1240 BAYSHORE HIGHWAY
BURLINGAME, CA 94010

DRAWN BY: XX
APPROVED BY: A. BEAUDIN
DATE: 02.20.01
SIZE: D

EQUIPMENT GA - SITE PLAN

EC CLEAN OCEAN
TANAPAG VILLAGE - ISLAND OF SAIPAN
COMMONWEALTH OF NORTHERN MARIANNAS

PROJECT CODE: 3005	CONTRACT CODE: XX	
SCALE: NTS	FILENAME: GA-1-02	SHEET: 1 OF 1
		REV: 0



ENVIRONMENTAL CHEMICAL CORPORATION
1240 BAYSHORE HIGHWAY
BURLINGAME, CA 94010

DRAWN BY: XX	**EQUIPMENT GA - SITE PLAN**
APPROVED BY: A. BEAUDIN	EC CLEAN OCEAN TANAPAG VILLAGE - ISLAND OF SAIPAN COMMONWEALTH OF NORTHERN MARIANNAS
DATE: 02.20.01	PROJECT CODE: 3005 CONTRACT CODE: XX
SIZE: D	SCALE: NTS FILENAME: GA-1-03 SHEET: 1 OF 1 REV: 0

Appendix D
Model Results and Source Test Measurement Standards

Mini Test Calculations
Saipan Phase III

Approach: Utilize NIOSH Method 5503 Polychlorobiphenyls ambient air test to sample the vent line for DRE and emssion limit compliance.

5503 limit of detection	0.03	ug/sample
Proposed Sample Rate	0.5	liter/min
Proposed Sample Time	60	min
Proposed Isokenetic single point		
MDL Emision Rate	1.00E-09	g/L
formula= (MDL/1E6/sample rate/duration)		
Test Feed rate	18	tons/hr
Average PCB concnetration	40	mg/kg
Residual PCB Concnetration	1	mg/kg
PCB to Condenser	1.404	lbs/hr
formula = (rate * 2000 *(ave PCB-res PCB)*1e-6)		
Expected Vent Rate @ 80 deg F	300	CFM
Vent Rate in liters @ 80 deg F	8490	LPM
Method Detection Emission in Vent	1.12E-06	lbs/hr
formula= (MDL Emission Rate * Vent Rate*60/453.9)		
DRE Equivalent	99.999920%	
formula = (1-(PCB to Condenser/MDE inVent)		

ENVIRONMENTAL
CHEMICAL
CORPORATION

February 1, 1999

New Jersey Department of Environmental Protection
Bureau of Technical Services
380 Scotch Road
West Trenton, NJ 08625

Attention: Mr. John Jenks

Reference: Environmental Chemical Corp. (02484)
PCP980001

Dear John,

Pursuant to permit requirements and our discussions, enclosed is a submittal of procedures, protocols, manufactures literature and calculations for measurement and reporting of emission data.

Details of methods for measurement for oxygen, carbon monoxide, non methane hydrocarbons, and PCB measurements is included.

As you are aware, we are starting our process up with non hazardous soils next week, contaminated the week after. The source test is scheduled for February 23, 1999.

Please feel free to contact me with any questions you may have at the number listed.

Sincerely,

Allen Beaudin, PE
Site Engineer

cc: K Pushaw

Industrial Latex
Superfund Site
350 Mt. Pleasant
Wallington, NJ 07057

Telephone:973-473-6500
Facsimile:973-473-5900

Environmental Chemical Corporation
Thermal Desorption Performance Monitoring

Appendices:

A-O2 Measurement Procedure and Checklist

B-OXOR II Calibration Procedure

C-Non Methane Hydrocarbons Measurement Procedure and Checklist

D. NIOSH Method 5503 and PCB Protocol

E-ViewPort FID Calibration Procedure

F-CO Measurement Procedure and Checklist

G-MONOXOR Calibration Procedure

H-Air Monitoring Log

I-OXOR II O&M Manual

J-Buck Sampling Pump O&M Manual

K-ViewPort O&M Manual

L-MONOXOR O&M Manual

1.0 INTRODUCTION

This Low Temperature Thermal Desorption (LTTD) Plan was prepared by Environmental Chemical Corporation (ECC) for the U.S. Army Corps of Engineers (USACE) Philadelphia District for the "Industrial Latex Superfund Site (ILSS), Phase II Soil Remediation" under Contract No. DACW41-98-D-9005, Task Order 0003. This plan is based on all available site specific data, including USACE Specification Section 02290. Work conducted under this contract will be performed in accordance with all applicable Federal, State, and local laws and regulations.

1.1 Purpose

The purpose of this LTTD Plan is to provide a discussion of the LTTD system and equipment pertaining to the treatment of contaminated soils at the ILSS. LTTD operations will not begin until the Contracting Officer (CO) reviews and approves this LTTD Plan. ECC predicts soil treatment rates of 10 to 14 tons per hour (tph) for the ILSS based on soil conditions and the treatability study performed during the Remedial Investigation/Feasibility Study (RI/FS). Conservative temperature profiles and reduced productivity are planned to maximize passing treatment standards.

1.2 Site Description

The ILSS is located at 350 Mount Pleasant Avenue in the Borough of Wallington, Bergen County, New Jersey (Figure 1). The property encompasses 9.67 acres in a mixed residential/industrial neighborhood. The site is bordered by a residential area including a tractor-trailer storage area to the north, the New Jersey (NJ) Transit Railroad line to the east, an outdoor recreational complex and residential area to the south, and an elementary school to the west. The Borough of Wood-Ridge is located directly east of the railroad line.

The ILSS is southeast of an extensive industrial development bordering the rail corridor. Industrial facilities near the ILSS include the Curtiss-Wright Corporation located in Wood-Ridge and the Farmland Dairies in Wallington. The Curtiss-Wright and Farmland Dairies facilities are currently undergoing environmental investigations under the New Jersey Industrial Site Recovery Act (ISRA), formerly the Environmental Cleanup Responsibility Act (ECRA).

Two buildings, comprising approximately 39,200 square feet of industrial space, previously occupied the site (Figure 2). These buildings were demolished and removed during Phase I; the concrete footings remain. Building 1 housed offices, a laboratory, the shipping warehouse, and chemical processes. Six chemical vats were located in this building along with a floor drain that ran down the building center and discharged to the on-site septic system. Building 2 served as the main production facility. Most of the equipment, including twenty-four chemical vats, were removed during Phase I remediation activities.

The ILSS contains three palustrine wetlands which cover approximately 0.8 acres (Figure 2). A large wetland runs from the NJ Transit Railroad Tracks along the northern property boundary (Wetland 1). This wetland is primarily a palustrine scrub/shrub wetland with portions being palustrine emergent and palustrine forested. Two smaller palustrine emergent wetlands are located south of Wetland 1 (Wetland 2 and Wetland 3); Wetland 3 is located approximately 90 feet from the southwest corner of Building 2. Historically, the groundwater table was measured approximately 12 feet below grade.

Responding to complaints from local officials concerning the disposal of waste products on the property, the New Jersey Department of Environmental Protection (NJDEP) performed site inspections in 1980 and 1983, sampling the contents of drums found on-site. Polychlorinated biphenyls (PCBs) and organic compounds were identified.

In 1985, NJDEP began enforcement efforts directing the site owner to remove and properly dispose of all on-site drums and contaminated soil. Due to of the owner's inability to remove these materials in a timely fashion, the United States Environmental Protection Agency (EPA) initiated a removal action in 1986. This removal action included the off-site disposal of aboveground drums present on-site. Information collected by the EPA during subsequent investigations provided the basis for including the Industrial Latex Site on the National Priorities List (NPL) for Superfund sites.

1.2.1 Site History

The Industrial Latex Corporation manufactured chemical adhesives, and natural and synthetic rubber compounds from 1951 until 1983. Adhesives were initially formulated using vegetable protein in a solvent base. Solvents utilized in the process included acetone, heptane, hexane, methyl ethyl ketone (MEK), and methylene chloride. PCBs were introduced as a fire retardant and for their bonding properties.

In the late 1970s, solvent-based adhesives were replaced by water-based latex adhesives. Intermittent processing of latex compounds continued at the site until October 1983, when all operations ceased. During operations, off-specification latex product was allegedly dumped into the Building 1 floor drain.

1.2.2 Previous Investigations

In 1989, EPA initiated a Remedial Investigation (RI) and Feasibility Study (FS). Field data collected during the RI investigation indicated PCB, semi-volatile organic compounds (SVOCs), and metal contamination located on building surfaces, in drums and vats located in the buildings, in buried drums, and in surface/subsurface soils both on the property and along the railway corridor. The following are the major conclusions of the RI:

- On-site surface and subsurface soils are contaminated primarily with Aroclor 1260, bis(2-ethylhexyl)phthalate and metals above the EPA proposed remediation goals and proposed NJDEP cleanup standards.

- Drums containing latex material are buried in the southeast corner of the site, at a depth of 0.5 to 10 feet below ground surface. In addition, several drums and related product are partially exposed along the rail corridor; an unknown number of drums are buried in this area.

- Sediments in the drainage channel along the western side of the railroad tracks are contaminated with Aroclor 1260, bis(2-ethylhexyl)phthalate, and metals above EPA proposed remediation goals and proposed NJDEP cleanup standards.

- Four septic tanks are contaminated with Aroclor 1260, bis(2-ethylhexyl)phthalate, and metals. The estimated volume of liquid remaining in these tanks is 800 gallons and the estimated total volume of sludge/soil is six cubic yards.

- Additional contamination is present in miscellaneous garbage, scrap metal and wood located on-site.

- Results of groundwater sampling were inconclusive and the extent of groundwater contamination remains undefined. This issue will be addressed under a separate EPA Region II program.

2.0 PROCESS DESCRIPTION

The LTTD system employs a process in which soils/sludges with organic contaminants are heated in an inert atmosphere utilizing a triple dryer, that removes both water and organic contaminants. The process consists of indirect soil treatment, condensation, water treatment, and residue disposal. The process flow diagram (Drawing 1-102) and Process and Instrumentation Diagrams (P&ID) showing all process equipment and associated instrumentation, piping, and valves, stacks, vents and dampers, and control equipment for the LTTD system are included in Appendix A. The process flow diagram delineates the direction of all material stream flows with lines, arrows, and unique identification numbers. The flow sheets for average and maximum operating conditions for the process flow streams shown on the process flow diagram are provided in Appendix A. These tables include the line sizes, temperature, flow rates, and composition of the flow streams, and is the basis for the process design and equipment specifications.

Contaminated material is screened to remove material that is greater than two inches in size. The screened materials are then loaded into the Mass Flow Feeder and transferred to the Dryer using conventional material handling equipment. The Mass Flow Feeder is operated with a variable speed drive and allows plant operators the ability to vary the feed rate. Material exiting the Mass Flow Feeder enters onto the Transfer Conveyor and is processed under a magnet to remove metal debris. Load weighing cells located on this conveyer give operators an indication of how much material is being processed through the system. The Feed Auger is the last of the three feed conveyors and provides the air/vapor seal on the input end of the Dryer. The soil level in the Feed Auger hopper is monitored with a camera.

Material is processed in a triple dryer that is indirectly heated with a 40 million British Thermal Units per hour (mmBTU/hr) flame source. Heat is transferred into two concentric cylindrical chambers to heat the material as it passes through the Dryer. The material can be heated to temperatures as high as 1000° F. The triple drier has demonstrated treatment rates in excess of 30 tons per hour on material contaminated with heavy oils. Soil exiting the drier passes through a double tipping valve arrangement that maintains the air/vapor seal on the output end of the Dryer. The material is then transferred to an auger for conditioning with water, completing the treatment process. The material is conveyed to soil bins for temporary storage through a Radial Stacker. Confirmation samples will be collected from the soil bins to verify that the cleanup criteria were satisfied.

Air Pollution Control (APC) equipment is used to remove particulates and condense steam and organic vapors produced during soil treatment. All off-gases are cooled in the Scrubber, Venturi and Spray Tower assemblies. The Recirculation Blower moves the sub-cooled gases through a

High Efficiency Particulate Air (HEPA) filter and vapor phase carbon filter polishing system. An Induced Draft (ID) Blower located after the HEPA filter allows the APC train and the Dryer to be operated under negative pressure.

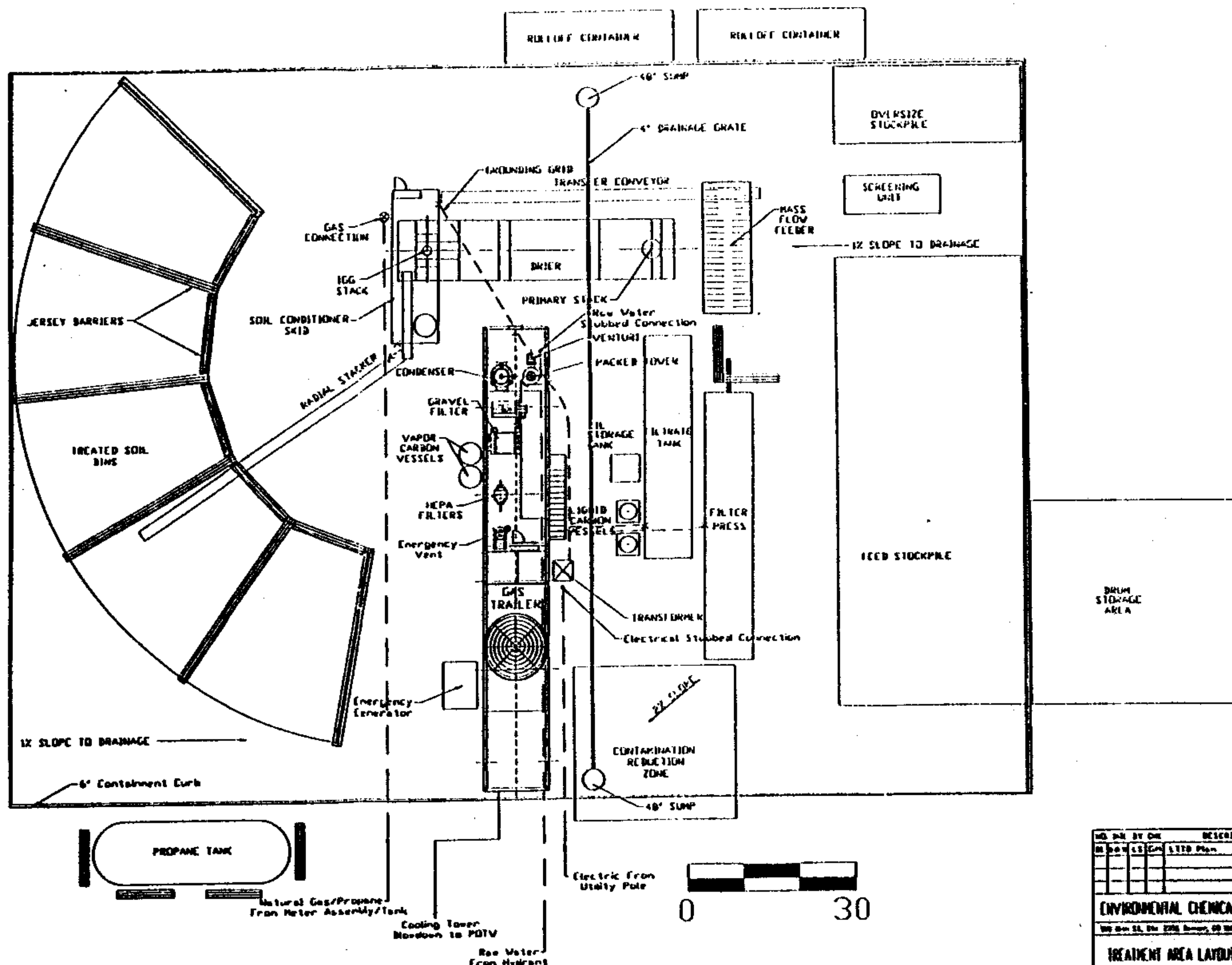
Water used in the APC train is treated to remove oils, organic compounds, and solids. A blowdown stream of this water is polished through carbon and used to re-hydrate treated material in the soil conditioner auger arrangement.

Water collected from the Scrubber, Venturi and Spray Tower sumps is passed through a clarifier to separate oils and solids from the water. Polymer additives are used in the clarification process to further enhance the oil/water/solid separation process. Oils collected from the Clarifier are stored in an organic storage tank for off-site incineration. Liquid organic compounds removed from the water will be treated at a licensed incineration facility. Solids are recycled for thermal treatment or disposed off-site at a Toxic Substance Control Act (TSCA) or Resource Conservation and Recovery Act (RCRA)-permitted disposal facility.

Steam and dust generated in the soil conditioner during re-hydration are collapsed in a closed loop system using cooling water supplied from evaporative coolers. Over 20 mmBTU/hr of system cooling capacity is supplied.

The LTTD system is fully instrumented. A programmable logic controller (PLC) is used to manage the process information collected from the instrumentation. Man-machine interface software provides operator and remote monitoring and data logging capabilities. Automatic Waste Feed Shut Offs (AWFSO) are enacted for non-compliance conditions. AWFSO conditions include at a minimum: high off-gas temperature, low scrubber flow, excess Continuous Emission Monitoring (CEM) system emissions, high scrubber temperature, high dryer pressure, and high oxygen content.

A CEM system measures and monitors the process emission variables as required pursuant to permit conditions. The CEM system may consist of a flame ionization detector (FID) organic analyzer (methane cutter option), CO/O_2 analyzer, and stack flow and temperature measurement devices depending on permit negotiations. Process sampling is time shared from various process locations including the scrubber outlet, between carbon vessels, and the stack. An emergency backup system assures steam and organic vapors are treated in the event of a power outage or failure.

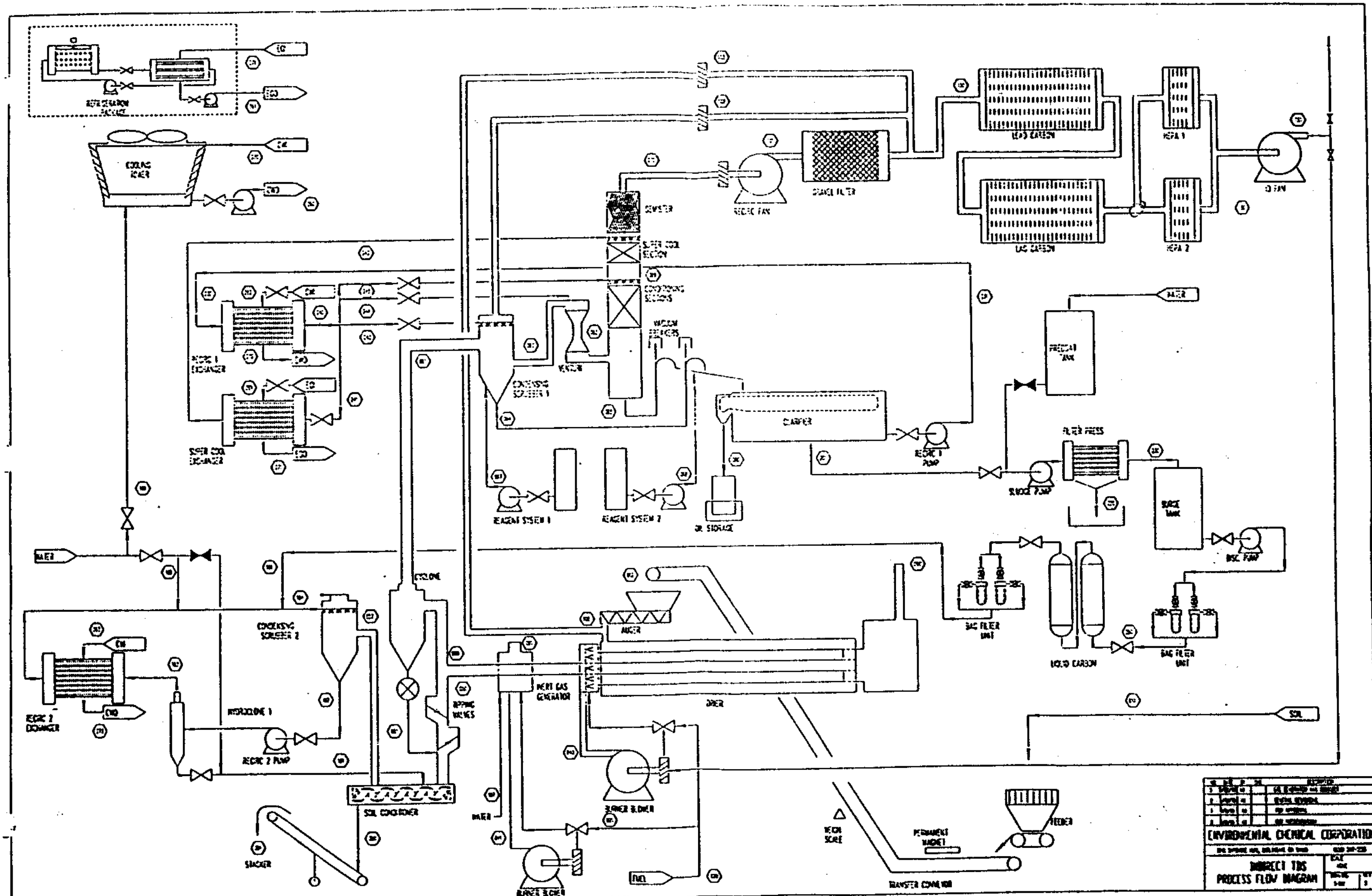


NO.	DATE	BY	CHK	DESCRIPTION
0	5-6-93	LS	GM	LTTD Plan

ENVIRONMENTAL CHEMICAL CORPORATION

TREATMENT AREA LAYOUT

SCALE 1" = 20'


REFRIGERATION PACKAGE
COOLING TOWER
DEMISTER
SUPER COOL SECTION
CONDITIONING SECTIONS
VACUUM BREAKERS
RECIRC FAN
CHARGE FILTER
LEAD CARBON
LAG CARBON
HEPA 1
HEPA 2
ID FAN
RECIRC 1 EXCHANGER
SUPER COOL EXCHANGER
VENTURI
CONDENSING SCRUBBER 1
CLARIFIER
RECIRC 1 PUMP
WATER
PRECOAT TANK
FILTER PRESS
SLUDGE PUMP
SURGE TANK
DISC PUMP
REAGENT SYSTEM 1
REAGENT SYSTEM 2
OIL STORAGE
BAG FILTER UNIT
LIQUID CARBON
CONDENSING SCRUBBER 2
CYCLONE
AUGER
DRIER
INERT GAS GENERATOR
RECIRC 2 EXCHANGER
HYDROCLONE 1
RECIRC 2 PUMP
RIPPING VALVES
SOIL CONDITIONER
STACKER
BURNER BLOWER
FUEL
WEIGH SCALE
PERMANENT MAGNET
TRANSFER CONVEYOR
FEEDER
SOIL
ENVIRONMENTAL CHEMICAL CORPORATION
INDIRECT TDS
PROCESS FLOW DIAGRAM

Section 2.0 : Sampling

2.0.1 All sampling and sampling equipment will be maintained, operated and calibrated in accordance with the manufacturers recommendations.

2.1 Oxygen

2.1.1 Equipment and Method (see appendix A)

2.1.2 Instrumentation

The instrument to be used in this process for Oxygen level sampling is the Bacharach OXOR II portable oxygen analyzer which reads concentrations between 0 and 25%. The sample is drawn up into the sensor chamber by use of a built -in motorized pump. It's accuracy is +/- 0.8% O2. The Calibration procedure is included in appendix B

2.2 Volatile Organic Compounds

2.2.1 Equipment and Method (see appendix C)

2.2.2 Instrumentation

The instrument to be used for sampling Volatile Organic Compounds (VOC's) is the Flame Iionization Detector (FID). The FID to be used in this case is the ViewPort portable hydrocarbon analyzer. The ViewPort will be set up to read in the "Carbon Counter" mode. This FID can be programmed for several hundred response factors. It's sensitivity will depend on the span of readings to be tested and the calibration gases used. This procedure for calibration is shown in appendix E.

2.3 Carbon Monoxide

2.3.1 Equipment and Method (see appendix F)

2.3.2 Instrumentation

The instrument to be used in sampling for carbon monoxide is the Bacharach Monoxor II. The Monoxor II analyzes samples drawn up by it's pump in concentrations from 0-2000ppm. The Monoxor II has a response time of 40 seconds to obtain 90% of it's final value. It is accurate to +/- 10ppm or +/- 5% of the reading, whichever is greater. The calibration of this unit is included in Appendix G.

2.4 PCB's

2.4.1 The method for collecting air samples for PCB's is the method called for in

NIOSH 5503 as shown in appendix D. Along with the method is a proposed sample protocol for PCB determination in the vent stream.

2.4.2 The instrument used to draw the sample is a A.P. Buck sampling pump in conjunction with a 13 mm glass fiber and Florisil filter for sample collection. The pump O&M manual is attached in appendix N.

Section 3.0: Record Keeping

All readings from the various instruments will be entered on the air monitoring log which will be collected on a daily basis in a three ring binder. A copy of the air monitoring log is included in Appendix H.

Appendix A
O2 Measurement Procedure and Checklist

O2 Measurement Procedure and Checklist

Equipment Required

1. ¼ Inch sample line mounted to rotary dryer stack. Sample line shall be stainless steel, leak tight and extract a sample 6" above test ports and from center of the stack. Sample tube shall be of sufficient length to cool sample to protect equipment.	
2. Sample line shall be equipped with an isolation valve to avoid flow when not in use	
3. Adequate supply of flexible tubing	
4. Disposable drierite/filter cartridge for capture of water and particulate - color indicating	
5. Hand held O2 analyzer	
6. Calibration gas kit consisting of calibration gas. Tedlar bags, regulator and tubing	
7. Compressed air supply and blow gun for cleaning sample line	

Procedure

1. Every eight hours of operations measure and calculate O2 emissions per the following conditions	
2. Open sample collection valve and purge with compressed air for 10 seconds using blow gun	
3. Zero and Span O2 analyzer	
4. Attach flex tube assembly consisting of flex tube, drierite cartridge and appropriate fittings to obtain a tight seal between the sample line, filter and O2 analyzer	
5. Attach O2 analyzer and extract for 2 minute to obtain a pure sample	
6. Note start time	
7. Measure and record O2 values every 10 seconds for a period of 60 seconds	
8. Average readings	
9. Perform O2 calculation	

Calculations

10 sec	20 sec	30 sec	40 sec	50 sec	60 sec
Average:		%			

Emission is within permit conditions if O2 >= 3% and O2 <= 14%

Compliance Certification

Equipment is IN / OUT of compliance by: ______________________ on ______________
(circle one)

Corrective action:

O2 is high or low due to the following causes

1. Oxygen is low, correct and re-sample - Management shall correct	
2. Oxygen is high, verify sample line is free of leaks	
3. Oxygen is high, correct and re-sample- Management shall correct	
4. Analyzer(s) are out of calibration	
5. Burners are improperly tuned, correct and re-sample - Management shall correct	

Appendix B

OXOR II Calibration Procedure

3.0 SENSOR CALIBRATION

The following procedure calibrates the OXOR II to a known concentration of Oxygen gas:

Procedure:

1. Adjust the OXOR II as follows:

   a. Ensure the instrument will be sampling fresh air (room air is typically 20.9% O_2).

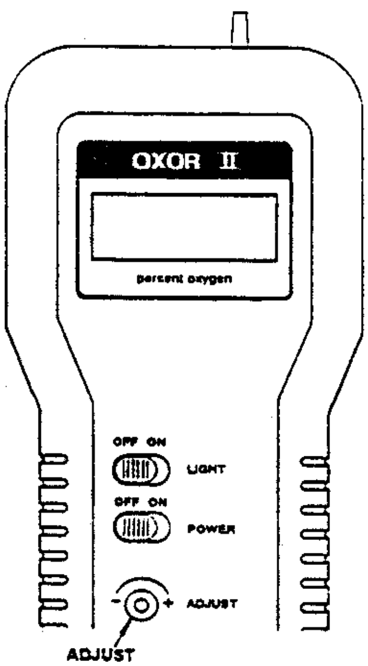
   b. Set front panel POWER switch to ON.

   Important! *Do not proceed with this calibration procedure if the instrument's "LO BAT" indicator is on. We recommend that the instrument be calibrated with a fresh set of batteries.*

   c. Wait until instrument's O_2 display settles down (approximately 1 min.); then, using a potentiometer adjustment tool, adjust the front panel ADJUST potentiometer (Fig 3-1) until the display shows 20.9% ±0.3.

2. Set front panel POWER switch to OFF.

Figure 3-1. 20.9% O_2 Adjustment



Appendix C

Non Methane Hydrocarbons
Measurement Procedure and Checklist

NON METHANE HYDROCARBONS Measurement Procedure and Checklist

Equipment Required

1. ¼ inch sample line mounted to rotary dryer stack. Sample line shall be stainless steel, leak tight and extract a sample 6" above test ports and from center of the stack. Sample tube shall be of sufficient length to cool sample to protect equipment.	
2. Sample line shall be equipped with an isolation valve to avoid flow when not in use	
3. Adequate supply of flexible tubing	
4. Disposable filter cartridge for capture of water and particulate	
5. Hand held FID analyzer calibrated to report ppm methane	
6. Methane cutter filter (pass only methane)	
7. Calibration gas kit consisting of calibration gas, Tedlar bags, regulator and tubing	
8. Compressed air supply and blow gun for cleaning sample line	

Procedure

1. Every eight hours of operations measure and calculate NON METHANE HYDROCARBONS emissions per the following conditions	
2. Measure and record O2 concentration	
3. Open sample collection valve and purge with compressed air for 10 seconds using blow gun	
4. Zero and Span FID analyzer	
5. Attach flex tube assembly consisting of flex tube, drierite cartridge and appropriate fittings to obtain a tight seal between the sample line, filter and FID analyzer	
6. Attach FID analyzer and extract for 2 minutes to obtain a pure sample	
7. Note start time	
8. Measure and record all HYDROCARBONS values every 10 seconds for a period of 60 seconds	
9. Install methane cutter filter before FID	
10. Attach FID analyzer and extract for 1 minute to obtain a pure sample	
11. Note start time	
12. Measure and record all methane only values every 10 seconds for a period of 60 seconds	
13. Average readings	
14. Perform NON METHANE HYDROCARBONS calculation	

Calculations

10 sec	20 sec	30 sec	40 sec	50 sec	60 sec
Average:		***ppm***		***Start:***	

Methane only measurement

10 sec	20 sec	30 sec	40 sec	50 sec	60 sec
Average:		***ppm***		***Start:***	

Om = O2 Concentration in % = ____________________

HCm = HC Concentration in ppm = ____________________

MHCm = Methane Concentration in ppm = ____________________

NMHC at 7% O2 = NMHC = (HCm - MHCm) * 13.9 / (20.9 - Om) (in ppm dry) = ______________

Emission is within permit conditions if NON METHANE HYDROCARBONS <= 50 ppm

Compliance Certification

Equipment is IN / OUT of compliance by: ____________________ on ____________________
(circle one)

NON METHANE HYDROCARBONS Measurement Procedure and Checklist

Corrective action:

NON METHANE HYDROCARBONS is high due to the following causes

1. Oxygen is low, correct and re-sample - Management shall correct	
2. Oxygen is high, verify sample line is free of leaks	
3. Oxygen is high, correct and re-sample- Management shall correct	
4. Analyzer(s) are out of calibration	
5. Burners are improperly tuned, correct and re-sample - Management shall correct	

Appendix D

NIOSH Method 5503 and PCB Protocol

Post-it® Fax Note 7671	Date	# of pages ▶
To Allen Bowden	From V. Fanning	
Co./Dept.	Co.	
Phone #	Phone #	

POLYCHLOROBIPHENYLS

FORMULA: mixture: $C_{12}H_{10-x}Cl_x$ [where x = 1 to 10]

M.W.: ca. 258 (42% Cl ; $C_{12}H_7Cl_3$)
ca. 326 (54% Cl ; $C_{12}H_5Cl_5$)

METHOD: 5503
ISSUED: 2/15/84

OSHA: 1 mg/m³ (42% Cl);
0.5 mg/m³ (54% Cl)
NIOSH: 0.001 mg/m³ [1,2]
ACGIH: 1 mg/m³ (42% Cl); STEL 2 mg/m³
0.5 mg/m³ (54% Cl); STEL 1 mg/m³
(skin)

PROPERTIES: 42% Cl: BP 325 to 366 °C; MP -19 °C; d 1.38 g/mL @ 25 °C; VP 0.01 Pa (8×10^{-5} mm Hg; 1 mg/m³) @ 20 °C [3]
54% Cl: BP 365 to 390 °C; MP 10 °C; d 1.54 g/mL @ 25 °C; VP 0.0004 Pa (3×10^{-6} mm Hg; 0.05 mg/m³) @ 20 °C [3]

SYNONYMS: PCB; CAS #1336-36-3; 1,1'-biphenyl chloro (CAS #27323-18-8); chlorodiphenyl, 42% Cl (Aroclor 1242; CAS #53469-21-9), and 54% Cl (Aroclor 1254; CAS #11097-69-1)

SAMPLING

SAMPLER: FILTER + SOLID SORBENT
(13-mm glass fiber + Florisil, 100 mg/50 mg)

FLOW RATE: 0.05 to 0.2 L/min

VOL-MIN: 1 L @ 0.5 mg/m³
-MAX: 50 L

SHIPMENT: transfer filters to glass vials after sampling

SAMPLE STABILITY: unknown for filters; 2 months for Florisil tubes [4]

BLANKS: 2 to 10 field blanks per set

ACCURACY

RANGE STUDIED: not studied

BIAS: none identified

OVERALL PRECISION (s_r): not evaluated

MEASUREMENT

TECHNIQUE: GAS CHROMATOGRAPHY, ECD (^{63}Ni)

ANALYTE: polychlorobiphenyls

DESORPTION: filter + front section, 5 mL hexane;
back section, 2 mL hexane

INJECTION VOLUME: 4 µL with 1-µL backflush

TEMPERATURE-INJECTION: 250 - 300 °C
-DETECTOR: 300 - 325 °C
-COLUMN: 180 °C

CARRIER GAS: N_2, 40 mL/min

COLUMN: glass, 1.8 m x 2 mm ID, 1.5% OV-17/1.95% QF-1 on 80/100 mesh Chromosorb WHP

CALIBRATION: commercial PCB mixture in hexane

RANGE: 0.4 to 4 µg per sample [5]

ESTIMATED LOD: 0.03 µg per sample [5]

PRECISION (s_r): 0.044 [4]

APPLICABILITY: The working range is 0.01 to 10 mg/m³ for a 40-L air sample [4].

INTERFERENCES: Chlorinated pesticides, such as DDT and DDE, may interfere with quantitation of PCB. Sulfur-containing compounds in petroleum products also interfere [6].

OTHER METHODS: This method combines and replaces Methods S120 [7] and P&CAM 244 [4]. Methods S121 [8] and P&CAM 253 [9] for PCB have not been revised.

REAGENTS:

1. Hexane, pesticide quality.
2. Florisil, 30/48 mesh sieved from 30/60 mesh. After sieving, dry at 105 °C for 45 min. Mix the cooled Florisil with 3% (w/w) distilled water.
3. Nitrogen, purified.
4. Stock standard solution of the PCB in methanol or isooctane (commercially available).*

*See Special Precautions.

EQUIPMENT:

1. Sampler: 13-mm glass fiber filter without binders in a Swinnex cassette (Cat. No. SX 0001300, Millipore Corp.) followed by a glass tube, 7 cm long, 6 mm OD, 4 mm ID containing two sections of 30/48 mesh deactivated Florisil. The front section is preceded by glass wool and contains 100 mg and the backup section contains 50 mg; urethane foam between sections and behind the backup section. Join the cassette and Florisil tube with PVC tubing, 3/8" L x 9/32" OD x 5/32" ID, on the outlet of the cassette and with another piece of PVC tubing, 3/4" L x 5/16" OD x 3/16" ID, complete the union.
2. Personal sampling pump, 0.05 to 0.2 L/min, with flexible connecting tubing.
3. Tweezers.
4. Vials, glass, 4- and 7-mL, with aluminum or PTFE-lined caps.
5. Gas chromatograph, electron capture detection (^{63}Ni), integrator and column (page 5503-1).
6. Volumetric flasks, 10-mL and other convenient sizes for preparing standards.
7. Syringe, 10-µL.

SPECIAL PRECAUTIONS: Avoid prolonged or repeated contact of skin with PCB and prolonged or repeated breathing of the vapor [1, 2, 10].

SAMPLING:

1. Calibrate each personal sampling pump with a representative sampler in line.
2. Break the ends of the sampler immediately before sampling. Attach sampler to personal sampling pump with flexible tubing.
3. Sample at an accurately known flow rate between 0.05 and 0.2 L/min for a total sample size of 1 to 50 L.
4. Transfer the glass fiber filters to 7-mL vials. Cap the Florisil tubes with plastic (not rubber) caps and pack securely for shipment.

SAMPLE PREPARATION:

5. Place the glass wool and 100-mg Florisil bed in the same 7-mL vial in which the filter was stored. Add 5.0 mL hexane.
6. In a 4 mL vial, place the 50-mg Florisil bed including the two urethane plugs. Add 2.0 mL hexane.
7. Allow to stand 20 min with occasional agitation.

CALIBRATION AND QUALITY CONTROL:

8. Calibrate daily with at least five working standards over the range 10 to 500 ng PCB/mL.
   a. Add known amounts of stock standard solution to hexane in 10-mL volumetric flasks and dilute to the mark.
   b. Analyze together with samples and blanks (steps 10 and 11).
   c. Prepare calibration graph (sum of areas of selected peaks vs. ng PCB/mL).
9. Determine desorption efficiency (DE) at least once for each lot of glass fiber filters and Florisil used for sampling in the calibration range (step 8). Prepare three tubes at each of five levels plus three media blanks.
   a. Remove and discard back sorbent section of a media blank Florisil tube.
   b. Inject known amounts of stock standard solution directly onto front sorbent section and onto a media blank filter with a microliter syringe.
   c. Cap the tube. Allow to stand overnight.
   d. Desorb (steps 5 through 7) and analyze together with working standards (steps 11 and 12).
   e. Prepare a graph of DE vs. ng PCB recovered.
10. Analyze three quality control blind spikes and three analyst spikes to insure that the calibration graph and DE graph are in control.

MEASUREMENT:

11. Set gas chromatograph according to manufacturer's recommendations and to conditions given on page 5503-1. Inject sample aliquot manually using solvent flush technique or with autosampler.
    NOTE 1: Where individual identification of PCB is needed, a procedure using a capillary column may be used [11].
    NOTE 2: If peak area is above the linear range of the working standards, dilute with hexane, reanalyze and apply the appropriate dilution factor in calculations.
12. Sum the areas for five or more selected peaks.

CALCULATIONS:

13. Determine the mass, ng (corrected for DE) of PCB found on the glass fiber filter (W) and in the Florisil front (W_f) and back (W_b) sorbent sections, and in the average media blank filter (B) and front (B_f) and back (B_b) sorbent sections.
    NOTE: If $W_b > W_f/10$, report breakthrough and possible sample loss.
14. Calculate concentration, C, of PCB in the air volume sampled, V (L):

$$C = \frac{(W+W_f + W_b - B-B_f - B_b)\cdot 10^{-3}}{V}, \text{ mg/m}^3.$$

EVALUATION OF METHOD:

This method uses 13-mm glass fiber filters which have not been evaluated for collecting PCB. In Method S120, however, Aroclor 1242 was completely recovered from 37-mm glass fiber filters using 15 mL isooctane [7,12,13]. With 5 mL of hexane, Aroclor 1016 was also completely recovered from 100-mg Florisil beds after one-day storage [4]. Thus, with no adsorption effect likely on glass fiber filters for PCB, 5 mL hexane should be adequate to completely extract PCB from combined filters and front sorbent sections. Sample stability on glass fiber filters has not been investigated. Breakthrough volume was >48 L for the Florisil tube at 75% RH in an atmosphere containing 10 mg/m³ Aroclor 1016 [4].

REFERENCES:

[1] Criteria for a Recommended Standard...Occupational Exposure to Polychlorinated Biphenyls. U.S. Department of Health, Education, and Welfare, Publ. (NIOSH) 77-225 (1977).

[2] Current Intelligence Bulletin 7, Polychlorinated Biphenyls (PCBs), U.S. Department of Health, Education, and Welfare, Publ. (NIOSH) 78-127 (1975).

[3] Hutzinger, O. S. Safe and V. Zitko. The Chemistry of PCBs, CRC Press, Inc., Cleveland, OH (1974).

[4] NIOSH Manual of Analytical Methods, 2nd. ed., V. 1, P&CAM 244, U.S. Department of Health, Education, and Welfare, Publ. (NIOSH) 77-157-A (1977).

[5] User check, Southern Research Institute, NIOSH Sequence #4121-U (unpublished, January 25, 1984).

[6] Hofstader, R. A., C. A. Bache, and D. J. Lisk. Bull. Environ. Contam. Toxicol., 11:136 (1974).

[7] NIOSH Manual of Analytical Methods, 2nd ed., V. 4, S120, U.S. Department of Health, Education, and Welfare, Publ. (NIOSH) 78-175 (1978).

[8] Ibid, V. 2, S121, U.S. Department of Health, Education, and Welfare, Publ. (NIOSH) 77-157-B (1977).

[9] Ibid, Vol. 1, P&CAM 253.

[10] Occupational Diseases, A Guide to Their Recognition, revised ed., 255-256, U.S. Department of Health, Education, and Welfare, Publ. (NIOSH) 77-181 (1978).

[11] Dunker, J. C. and M. T. J. Hillebrand. Characterization of PCB Components in Clophen Formulations by Capillary GC-MS and GC-ECD Techniques, Environ. Sci. Technol., 17 (8), 449-456 (1983).

[12] Backup Data Report for S120, prepared under NIOSH Contract 210-76-0123, available as "Ten NIOSH Analytical Methods, Set 2," Order No. PB 271-464 from NTIS, Springfield, VA 22161.

[13] NIOSH Research Report-Development and Validation of Methods for Sampling and Analysis of Workplace Toxic Substances, U.S. Department of Health and Human Services, Publ. (NIOSH) 80-133 (1980).

METHOD REVISED BY: James E. Arnold, NIOSH/DPSE; S120 originally validated under NIOSH Contract 210-76-0123.

Table 1. Composition of some Aroclors [3].

Major Components	Aroclor 1016	Aroclor 1242	Aroclor 1254
Biphenyl	<0.1%	<0.1%	<0.1%
Monochlorobiphenyls	1	1	<0.1
Dichlorobiphenyls	20	16	0.5
Trichlorobiphenyls	57	49	1
Tetrachlorobiphenyls	21	25	21
Pentachlorobiphenyls	1	8	48
Hexachlorobiphenyls	<0.1	1	23
Heptachlorobiphenyls	none detected	<0.1	6
Octachlorobiphenyls	none detected	none detected	none detected

ENVIRONMENTAL CHEMICAL
CORPORATION
999 18th Street; Suite 2350
Denver, Colorado 80202

Phone: (303) 298-7607
Fax: (303) 298-7837

☐ Memorandum ☐ Telecon ☐ Meeting Notes

Name(s): Allen Beaudin	Date: 1/29/99 Time: File Number:
	Project Name: INDUSTRIAL LATEX
	Project Number:
Phone: 973-473-6500	RE: PCB EMMISSION TEST

Proposed Sample protocal for PCB determinating in Vent stream

Permit Condition $\leq$ 1 ppmdv PCB

Method proposed: Modified NIOSH Method 5503

Detection Range (Per Method) 0.4 – 4 μg (0.03μg LOD)

Sample Media (glass fiber + Florisil (100/50))

Sample Rate 0.5 liter/minute * Variation in method

Sample Extraction: Close to "Iso-Kenetic"

Sample Duration: 1 hour at sample rate

Calculation

Find sample mass collected for stream with 1ppm at above sample rate and method

$$\mu g\ PCP = \frac{1\times10^{-6}\,\ell_{pcb}}{\ell_{gas}}\left|\frac{0.5\,\ell}{min}\right|\frac{60\,min}{sample}\left|\frac{300\,g}{g\text{-}mol}\right|\frac{1\,atm}{}\left|\frac{g\,mol\ {}^\circ K}{0.082\,m^3\,atm}\right|\frac{}{298\,{}^\circ K}\left|\frac{m^3}{1000\,\ell}\right.$$

$$= 0.37\,\mu g \text{ sample}$$

Copies To:
☐ ☐ ☐ ☐ ☐ ☐

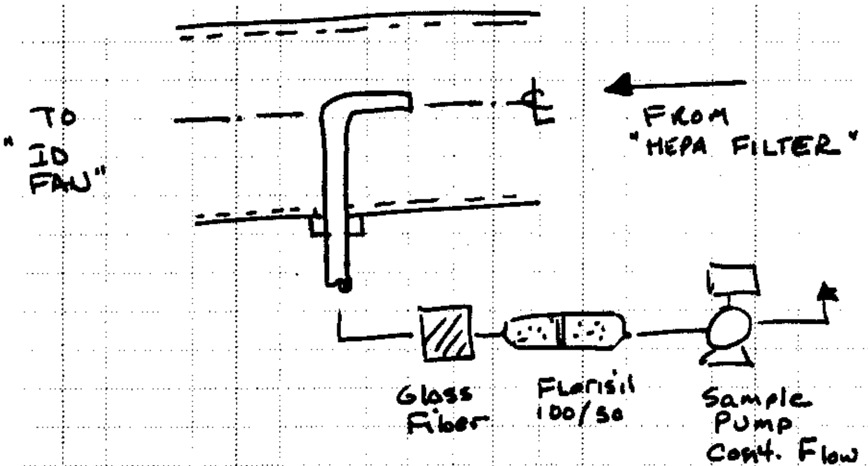
By: Date:

ENVIRONMENTAL CHEMICAL CORPORATION
999 18th Street; Suite 2350
Denver, Colorado 80202

Phone: (303) 298-7607
Fax: (303) 298-7837

☐ Memorandum ☐ Telecon ☐ Meeting Notes

Name(s):	Date: 1/29/99 Time: File Number:
Allen Beaudin	Project Name:
	Project Number:
Phone: 973-473-6500	RE: TSO-KENETIC RATE



10" diameter

10" ø Sample Line @ 0.55 ft²

Flow	Velocity	DIA TUBE
250 CFM	460 ft/min	0.08 in
500 CFM	917 ft/min	0.06 in
750 CFM	1375 ft/min	0.05 in

Copies To:
☐ ☐ ☐ ☐ ☐ ☐

By: Date:

Appendix F

CO Measurement Procedure and Checklist

CO Measurement Procedure and Checklist

Equipment Required

1. ¼ Inch sample line mounted to rotary dryer stack. Sample line shall be stainless steel, leak tight and extract a sample 6" above test ports and from center of the stack. Sample tube shall be of sufficient length to cool sample to protect equipment.	
2. Sample line shall be equipped with an isolation valve to avoid flow when not in use	
3. Adequate supply of flexible tubing	
4. Disposable drierite/filter cartridge for capture of water and particulate - color indicating	
5. Hand held CO analyzer	
6. Calibration gas kit consisting of calibration gas, Tedlar bags, regulator and tubing	
7. Compressed air supply and blow gun for cleaning sample line	

Procedure

1. Every eight hours of operations measure and calculate CO emissions per the following conditions	
2. Measure and record O2 concentration	
3. Open sample collection valve and purge with compressed air for 10 seconds using blow gun	
4. Zero CO analyzer	
5. Attach flex tube assembly consisting of flex tube, drierite cartridge and appropriate fittings to obtain a tight seal between the sample line, filter and CO analyzer	
6. Attach CO analyzer and extract for 2 minute to obtain a pure sample	
7. Note start time	
8. Measure and record CO values every 10 seconds for a period of 60 seconds	
9. Average readings	
10. Perform CO calculation	

Calculations

10 sec	20 sec	30 sec	40 sec	50 sec	60 sec
Average:		*ppm*			

Om = O2 Concentration in % = ____________________

Cm = CO Concentration in ppm = ____________________

CO at 7% O2 = Ca = Cm * 13.9 / (20.9 - Om) in ppm dry = ____________________

Emission is within permit conditions if Ca <= 100 ppm

Compliance Certification

Equipment is IN / OUT of compliance by: ______________________________ on ____________________
(circle one)

Corrective action:

CO is high due to the following causes

1. Oxygen is low, correct and re-sample - Management shall correct	
2. Oxygen is high. verify sample line is free of leaks	
3. Oxygen is high, correct and re-sample- Management shall correct	
4. Analyzer(s) are out of calibration	
5. Burners are improperly tuned, correct and re-sample - Management shall correct	

State of New Jersey
Department of Environmental Protection

Christine Todd Whitman
Governor

Robert C. Shinn, Jr.
Commissioner

Bureau of Technical Services
P.O. Box 437
Trenton, N.J. 08625
Tel. (609) 530-4041
Fax (609) 530-4504

February 8, 1999

Allen Beaudin, PE
Environmental Chemical Corporation
999 18th Street
Denver, CO 80202

RE: Monitoring Protocol for Environmental Chemical Corp. LTTD Unit
Industrial Latex Superfund Site
350 Mt. Pleasant
Wallington, Bergen County
Facility #02484, PCP980001

Dear Mr. Beaudin:

Our office has received your proposed monitoring protocol for the above referenced facility. The request has been reviewed and evaluated for its technical applicability and compliance with the associated permit. The protocol meets the requirements of the permit and is approved for immediate use. Together with the permit these conditions constitute the approved monitoring protocol for the above referenced facility.

If you have any questions please call me at 609-530-5315.

Sincerely,

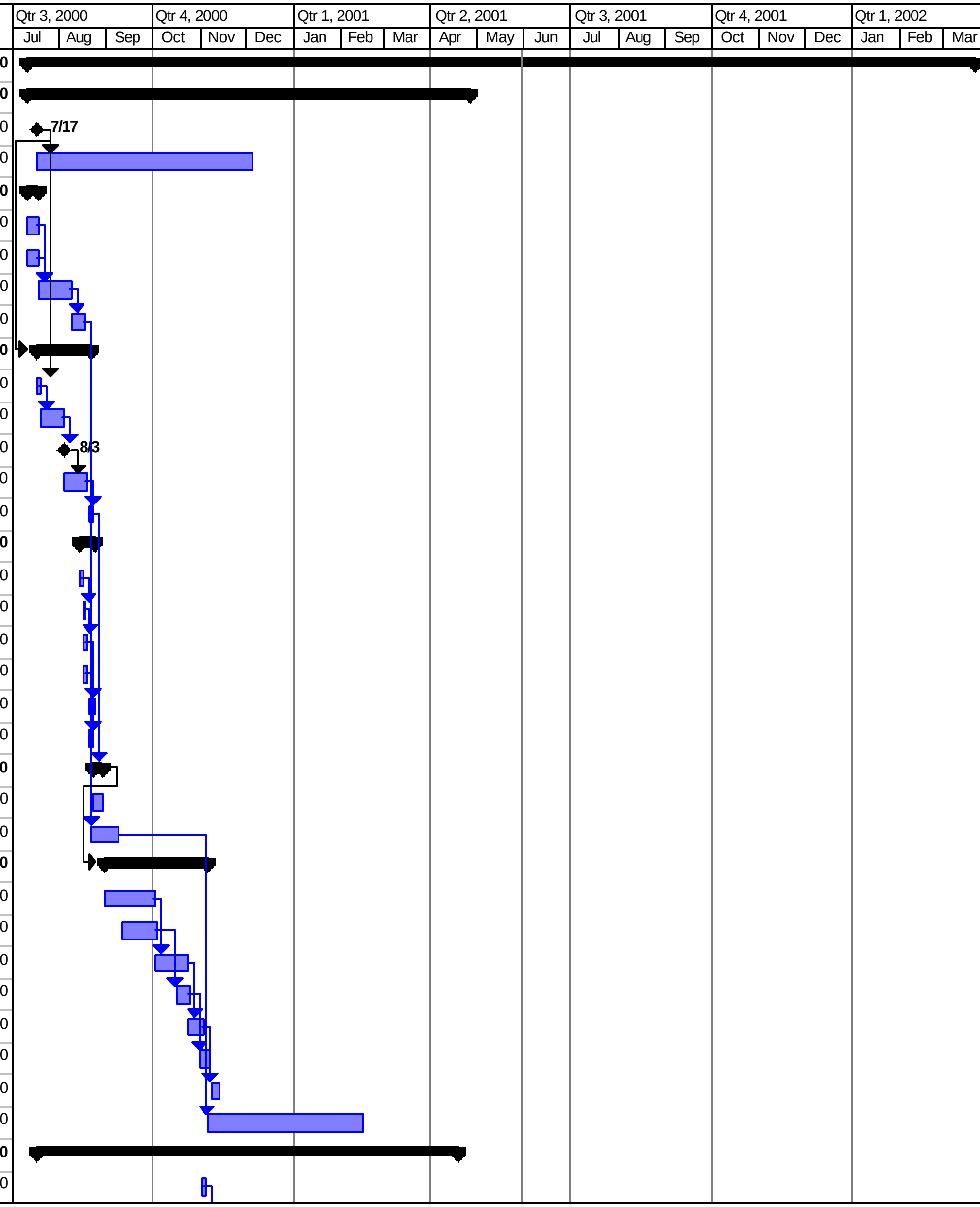
John W. Jenks
Research Scientist
Bureau of Technical Services

c. Metro Field Office

Appendix E
Phases III and IV Consolidated Project Schedule

Project Schedule
Tanapag Vilage, Island of Saipan, CNMI
USACE Contract No. DACW62-00-D-0001, CTO 0002

ID	Task Name	Duration	Start
1	**Tanapag Phase III/Phase IV PCB Remediation**	**451 days**	**Tue 7/11/00**
2	**Characterization & Excavation**	**216 days**	**Tue 7/11/00**
3	Notice To Proceed	0 days	Mon 7/17/00
4	Coordinate w/Environmental Branch	104 days	Mon 7/17/00
5	**Preparation of Project Plans**	**7 days**	**Tue 7/11/00**
6	Draft work Plan/SAP	7 days	Tue 7/11/00
7	Draft H&S Plan	7 days	Tue 7/11/00
8	Government Review	15 days	Wed 7/19/00
9	Finalization of WP, SAP and HSP	7 days	Wed 8/9/00
10	**Mobilization of Equipment and Supplies**	**27 days**	**Mon 7/17/00**
11	Procure supplies and materials	3 days	Mon 7/17/00
12	Load container	11 days	Thu 7/20/00
13	Deliver container to port of Oakland	0 days	Thu 8/3/00
14	Transit to Saipan	11 days	Fri 8/4/00
15	Customs clearance and delivery to site	2 days	Mon 8/21/00
16	**Site Set Up and Preparation**	**9 days**	**Mon 8/14/00**
17	Meetings with DEQ and support agencies	2 days	Mon 8/14/00
18	Site set up	1 day	Wed 8/16/00
19	Brush clearing of Cemetery 2	2 days	Thu 8/17/00
20	Green waste removal	3 days	Wed 8/16/00
21	Set up field laboratory	4 days	Mon 8/21/00
22	Establish sampling grids-cemetery 2	2 days	Mon 8/21/00
23	**Prepare soil holding cells**	**5 days**	**Wed 8/23/00**
24	Assemble structure	5 days	Wed 8/23/00
25	Characterization Sampling Cemetery 2	14 days	Tue 8/22/00
26	**Removal Action-Cemetery 2**	**48 days**	**Thu 8/31/00**
27	First round excavation Cemetery 2	23 days	Thu 8/31/00
28	First round verification sampling Cemetery 2	17 days	Mon 9/11/00
29	Second round excavation Cemetery 2	16 days	Tue 10/3/00
30	Second round verification sampling Cemetery 2	8 days	Mon 10/16/00
31	Additional excavation Cemetery 2	7 days	Wed 10/25/00
32	Additional verification sampling Cemetery 2	4 days	Wed 11/1/00
33	Site restoration Cemetery 2	5 days	Wed 11/8/00
34	**Characterization Sampling village Sites**	**80 days**	**Mon 11/6/00**
35	**Removal Action -Village Sites**	**206 days**	**Mon 7/17/00**
36	First round excavation site NN	2 days	Thu 11/2/00

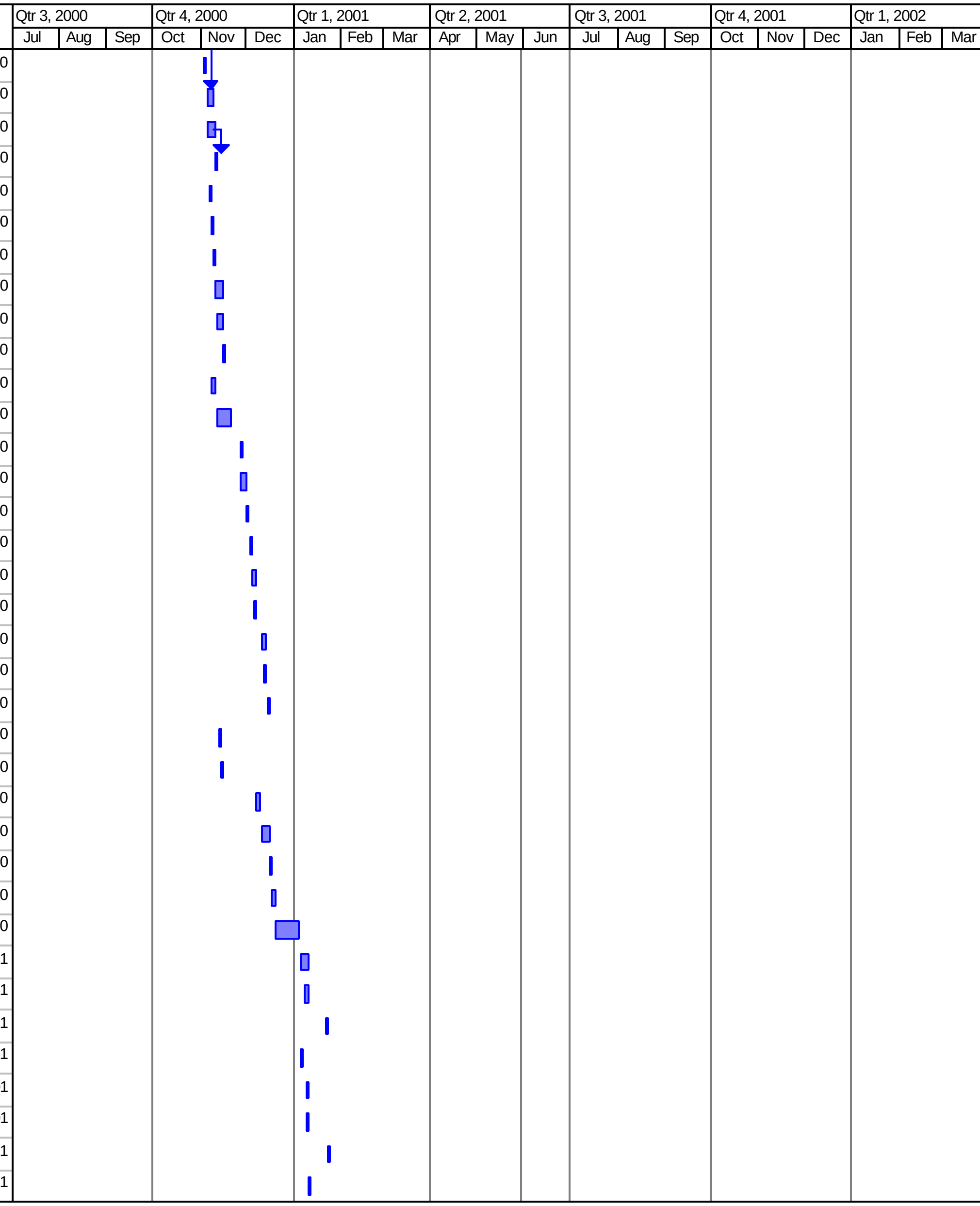


Project: TANAPAG
Date: Wed 5/30/01

Task		Milestone	◆	Rolled Up Task		Rolled Up Progress		External Tasks	
Progress		Summary		Rolled Up Milestone	◆	Split		Project Summary	

Project Schedule
Tanapag Vilage, Island of Saipan, CNMI
USACE Contract No. DACW62-00-D-0001, CTO 0002

ID	Task Name	Duration	Start
37	Verification sampling site NN	0.5 days	Fri 11/3/00
38	Additional excavation site NN	4 days	Mon 11/6/00
39	Verification sampling site NN	5 days	Mon 11/6/00
40	Restoration site NN	1 day	Sat 11/11/00
41	Verification sampling site E	1 day	Tue 11/7/00
42	Second round excavation site E	2 days	Wed 11/8/00
43	Verification sampling site E	1 day	Fri 11/10/00
44	Additional excavation site E	5 days	Sat 11/11/00
45	Verification sampling site E	4 days	Mon 11/13/00
46	Restoration site E	1 day	Fri 11/17/00
47	Installation of coral road site UU	2 days	Thu 11/9/00
48	Additional excavation and sampling	6 days	Mon 11/13/00
49	Restoration site LL	1 day	Tue 11/28/00
50	Verification sampling Kim's enterprises	3 days	Tue 11/28/00
51	Restoration Kim's site	1 day	Fri 12/1/00
52	First round verification sampling site EEJJ	1 day	Mon 12/4/00
53	Second round excavation site EEJJ	3 days	Tue 12/5/00
54	Second round verification sampling site EEJJ	1 day	Thu 12/7/00
55	Third round excavation site EEJJ	3 days	Mon 12/11/00
56	Verification sampling site EEJJ	1 day	Wed 12/13/00
57	Restoration site EEJJ	2 days	Fri 12/15/00
58	Verification sampling site A	1 day	Tue 11/14/00
59	Restoration site A	1 day	Wed 11/15/00
60	First round verification sampling site SSTT	2 days	Fri 12/8/00
61	Second excavation site SSTT	5 days	Mon 12/11/00
62	Verification sampling site SSTT	1 day	Sat 12/16/00
63	Restoration site SSTT	2 days	Mon 12/18/00
64	Christmas Beak	11 days	Thu 12/21/00
65	Excavation Kim's (2)	4 days	Sat 1/6/01
66	Verification sampling Kim's (2)	3 days	Mon 1/8/01
67	Restoration Kim's (2) site	2 days	Mon 1/22/01
68	Demolish Head start Center	1 day	Sat 1/6/01
69	First round excavation site BB	1 day	Wed 1/10/01
70	First round verification sampling site BB	1 day	Wed 1/10/01
71	Restoration site BB	1 day	Tue 1/23/01
72	Second round excavation site SSTT	1 day	Thu 1/11/01

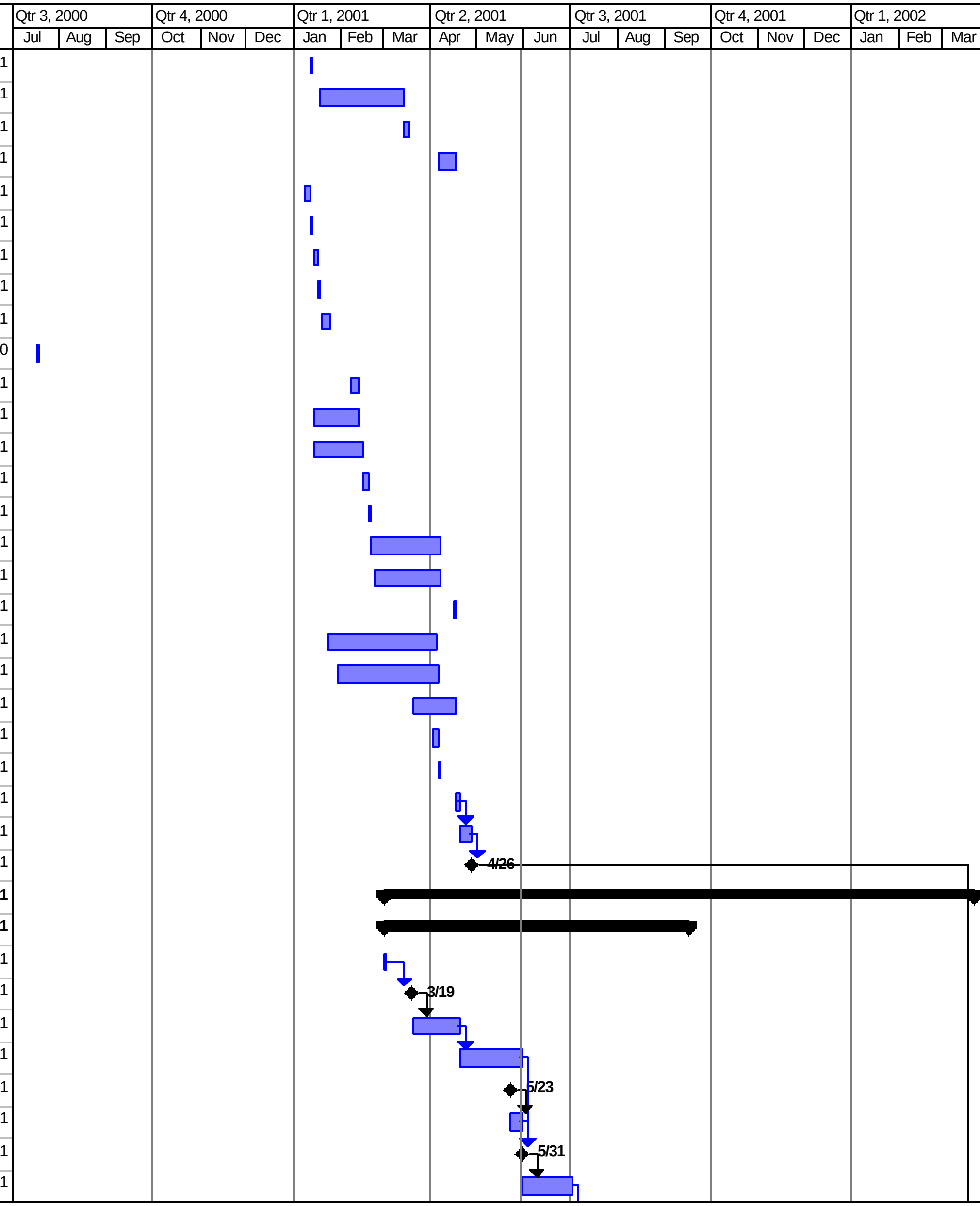


Project: TANAPAG
Date: Wed 5/30/01

Task | Milestone | Rolled Up Task | Rolled Up Progress | External Tasks
Progress | Summary | Rolled Up Milestone | Split | Project Summary

Project Schedule
Tanapag Vilage, Island of Saipan, CNMI
USACE Contract No. DACW62-00-D-0001, CTO 0002

ID	Task Name	Duration	Start
73	Verification sampling second round site SSTT	2 days	Fri 1/12/01
74	Additional excavation and sampling site SSTT	40 days	Thu 1/18/01
75	Restoration site SSTT	3 days	Thu 3/15/01
76	Landscaping site SSTT	7 days	Fri 4/6/01
77	First round excavation site AACC	4 days	Tue 1/9/01
78	First round verification sampling site AACC	1 day	Sat 1/13/01
79	Second round excavation site AACC	2 days	Mon 1/15/01
80	Second round verification sampling site AACC	1 day	Wed 1/17/01
81	Additional excavation site AACC	4 days	Fri 1/19/01
82	Additional verification sampling site AACC	1 day	Mon 7/17/00
83	Restoration site AACC	3 days	Thu 2/8/01
84	Additional excavation (multiple rounds) site A	21 days	Mon 1/15/01
85	Verification sampling site A	23 days	Mon 1/15/01
86	Restoration site A	3 days	Thu 2/15/01
87	Structure demolition site EEJJ	1 day	Mon 2/19/01
88	Additional excavation rounds site EEJJ	34 days	Wed 2/21/01
89	Additional sampling (multiple rounds) site EEJJ	32 days	Fri 2/23/01
90	Restoration site EEJJ	2 days	Mon 4/16/01
91	C1 Excavation (incorporates sites C1,Q,J,M and N)	51 days	Wed 1/24/01
92	C1 verification sampling	48 days	Tue 1/30/01
93	Restoration site C1	21 days	Tue 3/20/01
94	Additional excavation (3) site A	3 days	Tue 4/3/01
95	Additional verification sampling (3) site A	1 day	Thu 4/5/01
96	Restoration site A	2 days	Wed 4/18/01
97	Demobilization	5 days	Fri 4/20/01
98	Characterization & Excavation Work Complete	0 days	Thu 4/26/01
99	**ITD Phase**	**277 days**	**Thu 3/1/01**
100	**ITD Planning Documents**	**143 days**	**Thu 3/1/01**
101	Develop Draft Treatment Plan Documents	1 day	Thu 3/1/01
102	Submit Draft Treatment Plan Documents to EPA	0 days	Mon 3/19/01
103	EPA Review of Draft Treatment Plan Documents	23 days	Tue 3/20/01
104	Develop Draft Final Treatment Plan	29 days	Fri 4/20/01
105	Submit Working Draft Final to USACE	0 days	Wed 5/23/01
106	Revise Draft Final Treatment Plan	6 days	Wed 5/23/01
107	Submit Draft Final Treatment Plan Documents to EPA	0 days	Thu 5/31/01
108	EPA Review of Draft Final Documents	23 days	Thu 5/31/01

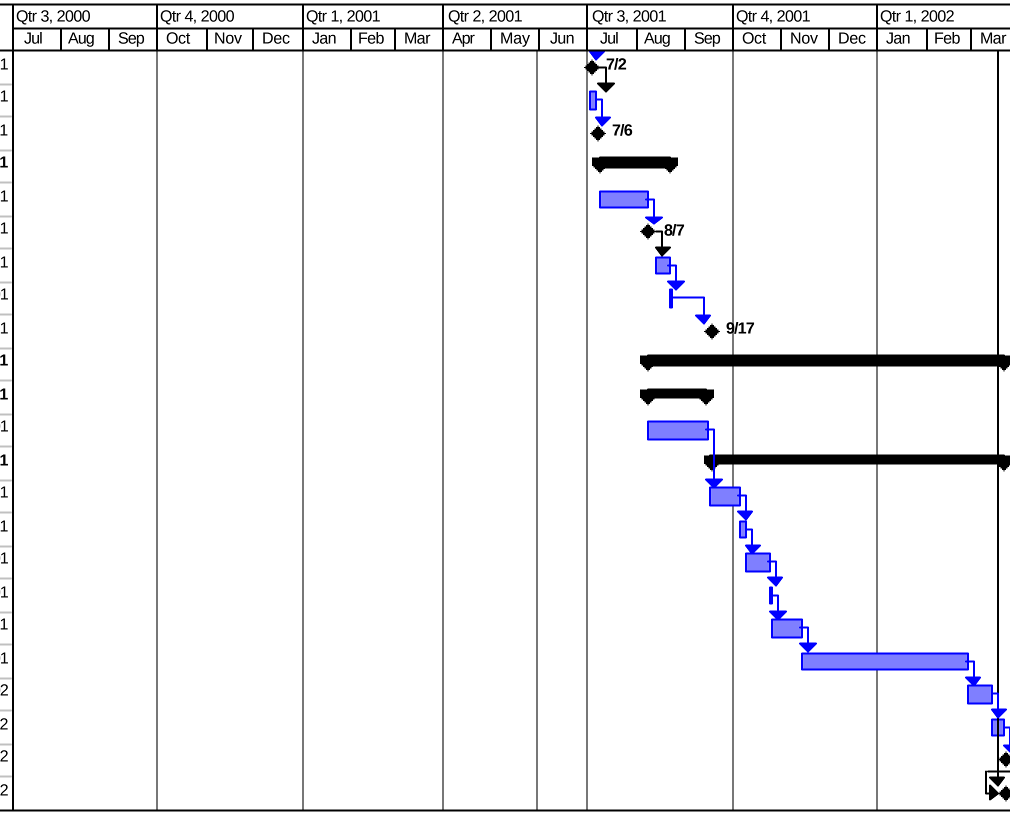


Project: TANAPAG
Date: Wed 5/30/01

Task | Milestone | Rolled Up Task | Rolled Up Progress | External Tasks
Progress | Summary | Rolled Up Milestone | Split | Project Summary

Project Schedule
Tanapag Vilage, Island of Saipan, CNMI
USACE Contract No. DACW62-00-D-0001, CTO 0002

ID		Task Name	Duration	Start
109		Receive EPA comments on Draft Final Treatment Plan Documents	0 days	Mon 7/2/01
110		Develop Final Treatment Plan Documents	4 days	Tue 7/3/01
111		Submit Final Treatment Plan Documents to USACE	0 days	Fri 7/6/01
112		**Community Review Process**	**33 days**	**Mon 7/9/01**
113		Community Review of Treatment Plan	22 days	Mon 7/9/01
114		Receive Community Comments	0 days	Tue 8/7/01
115		Revise Treatment Plan Documents	7 days	Mon 8/13/01
116		Distribute Treatment Plan Documents	1 day	Wed 8/22/01
117		Final Treatment Plan Documents Approval	0 days	Mon 9/17/01
118		**Saipan ITD Construction, Testing, & Operation**	**162 days**	**Wed 8/8/01**
119		**Mobilize To Saipan**	**28 days**	**Wed 8/8/01**
120		Ship Components To Saipan	28 days	Wed 8/8/01
121		**Operation of ITD in Saipan**	**134 days**	**Mon 9/17/01**
122		Setup In Saipan	14 days	Mon 9/17/01
123		Clean Soil Test	3 days	Fri 10/5/01
124		Interim Operations	10 days	Wed 10/10/01
125		Source Test	2 days	Wed 10/24/01
126		Test Results	13 days	Fri 10/26/01
127		Full Scale Operations	75 days	Wed 11/14/01
128		Decontamination	12 days	Wed 2/27/02
129		Demobilization	5 days	Fri 3/15/02
130		ITD Phase Complete	0 days	Thu 3/21/02
131		Tanapag Phase III / Phase IV PCB Remediation Complete	0 days	Thu 3/21/02



Project: TANAPAG
Date: Wed 5/30/01

Task | Progress | Milestone | Summary | Rolled Up Task | Rolled Up Milestone | Rolled Up Progress | Split | External Tasks | Project Summary

Appendix F
Inspection, Control and Operation Forms

ECC INDUSTRIAL LATEX SUPERFUND SITE
LTTD DAILY SHIFT REPORT

Date: ______________________________

Shift Personnel ____

AM Shift		PM Shift	
Average Feed Rate		Average Feed Rate	
Total Tons for Shift		Total Tons for Shift	
Shift Available Hours		Shift Available Hours	
Shift Actual Online Hours		Shift Actual Online Hours	

Positions During Shift (number)		Positions During Shift (number)	
Lead Thermal Operators		Lead Thermal Operators	
Control Room Operators		Control Room Operators	
Pad Operators		Pad Operators	
I & E / Maintenance Manager		I & E / Maintenance Manager	
Pad Equipment Operator		Pad Equipment Operator	

Shift Events	Shift Events

ECC ILSS
Dryer / APC Log Sheet Dayshift

Operators:				Date:		
Description	7:00	9:00	11:00	13:00	15:00	17:00
Gas supply pressure to dryer (psi)						
Totalizer reading						
Feed rate (TPH)						
Dryer outlet pressure (inches WC)						
Emergency nitrogen pressure (psi)						
Air compressor pressure (psi)						
Cyclone pressure drop (inches WC)						
Scrubber inlet pressure (inches WC)						
Eductor / spray tower pressure drop (inches WC)						
Recirc fan inlet pressue (inches WC)						
Gravel filter pressure drop (inches WC)						
Hepa filter pressure drop (inches WC)						
ID fan pressure (inches WC)						
Dryer flue gas temp (°F)						
Inert gas generator temp (°F)						
Dryer discharge soil temp (°F)						
Dryer shell temp (°F)						
Dryer exhaust gas temp (°F)						
Scrubber inlet gas temp (°F)						
Scrubber outlet gas temp (°F)						
Eductor outlet gas temp (°F)						
Spay tower section 1 outlet temp (°F)						
Spay tower section 2 outlet temp (°F)						
Carbon vessel gas inlet temp (°F)						
Carbon vessel gas outlet temp (°F)						
Initials						
Comments						

ECC ILSS
Dryer / APC Log Sheet Nightshift

Operators:				Date:		
Description	19:00	21:00	23:00	25:00:00	27:00:00	29:00:00
Gas supply pressure to dryer (psi)						
Totalizer reading						
Feed rate (TPH)						
Dryer outlet pressure (inches WC)						
Emergency nitrogen pressure (psi)						
Air compressor pressure (psi)						
Cyclone pressure drop (inches WC)						
Scrubber inlet pressure (inches WC)						
Eductor / spray tower pressure drop (inches WC)						
Recirc fan inlet pressue (inches WC)						
Gravel filter pressure drop (inches WC)						
Hepa filter pressure drop (inches WC)						
ID fan pressure (inches WC)						
Dryer flue gas temp (°F)						
Inert gas generator temp (°F)						
Dryer discharge soil temp (°F)						
Dryer shell temp (°F)						
Dryer exhaust gas temp (°F)						
Scrubber inlet gas temp (°F)						
Scrubber outlet gas temp (°F)						
Eductor outlet gas temp (°F)						
Spay tower section 1 outlet temp (°F)						
Spay tower section 2 outlet temp (°F)						
Carbon vessel gas inlet temp (°F)						
Carbon vessel gas outlet temp (°F)						
Initials						
Comments						

ECC ILSS
W.W.T. Log Sheet Dayshift

Operators:	Date:

Description	7:00	9:00	11:00	13:00	15:00	17:00
Plant water pressure (psi)						
Plant seal water pressure (psi)						
Carbon inlet bag filter pressure drop (psi)						
Carbon outlet bag filter pressure drop (psi)						
Filter press chamber presssure (psi)						
Cooling tower inlet exch temp (°F)						
Cooling tower outlet exch temp (°F)						
Eductor flow (gpm)						
Scrubber # 1 exch inlet cooling tower press (psi)						
Scrubber # 1 exch inlet recirc water press (psi)						
Scrubber # 1 exch inlet recirc water temp (°F)						
Scrubber # 1 exch outlet cooling tower press (psi)						
Scrubber # 1 exch outlet recirc water press (psi)						
Scrubber # 1 exch outlet recirc water temp (°F)						
Scrubber # 1 flow (gpm)						
Scrubber # 1 manifold pressure (psi)						
Scrubber # 1 seal water flow (gpm)						
Scrubber # 1 pH						
Scrubber # 2 flow (gpm)						
Scrubber # 2 exch inlet cooling tower press (psi)						
Scrubber # 2 exch inlet recirc water press (psi)						
Scrubber # 2 exch outlet cooling tower press (psi)						
Scrubber # 2 exch outlet recirc water press (psi)						
Scrubber # 2 exch inlet recirc water temp (°F)						
Scrubber # 2 exch outlet recirc water temp (°F)						
Scrubber # 2 seal water flow (gpm)						
Super cool exch inlet glycol press (psi)						
Super cool exch inlet glycol temp (°F)						
Super cool exch outlet glycol press (psi)						
Super cool exch outlet glycol temp (°F)						
Super cool exch water flow (gpm)						
Super cool exch inlet water press (psi)						
Super cool exch inlet water temp (°F)						
Super cool exch outlet water press (psi)						
Super cool exch outlet water temp (°F)						
Initials						
Comments						

ECC ILSS
W.W.T. Log Sheet Nightshift

Operators:	Date:

Description	19:00	21:00	23:00	25:00:00	27:00:00	29:00:00
Plant water pressure (psi)						
Plant seal water pressure (psi)						
Carbon inlet bag filter pressure drop (psi)						
Carbon outlet bag filter pressure drop (psi)						
Filter press chamber presssure (psi)						
Cooling tower inlet exch temp (°F)						
Cooling tower outlet exch temp (°F)						
Eductor flow (gpm)						
Scrubber # 1 exch inlet cooling tower press (psi)						
Scrubber # 1 exch inlet recirc water press (psi)						
Scrubber # 1 exch inlet recirc water temp (°F)						
Scrubber # 1 exch outlet cooling tower press (psi)						
Scrubber # 1 exch outlet recirc water press (psi)						
Scrubber # 1 exch outlet recirc water temp (°F)						
Scrubber # 1 flow (gpm)						
Scrubber # 1 manifold pressure (psi)						
Scrubber # 1 seal water flow (gpm)						
Scrubber # 1 pH						
Scrubber # 2 flow (gpm)						
Scrubber # 2 exch inlet cooling tower press (psi)						
Scrubber # 2 exch inlet recirc water press (psi)						
Scrubber # 2 exch outlet cooling tower press (psi)						
Scrubber # 2 exch outlet recirc water press (psi)						
Scrubber # 2 exch inlet recirc water temp (°F)						
Scrubber # 2 exch outlet recirc water temp (°F)						
Scrubber # 2 seal water flow (gpm)						
Super cool exch inlet glycol press (psi)						
Super cool exch inlet glycol temp (°F)						
Super cool exch outlet glycol press (psi)						
Super cool exch outlet glycol temp (°F)						
Super cool exch water flow (gpm)						
Super cool exch inlet water press (psi)						
Super cool exch inlet water temp (°F)						
Super cool exch outlet water press (psi)						
Super cool exch outlet water temp (°F)						
Initials						

Comments

ECC INDUSTRIAL LATEX SUPERFUND SITE
LTTD SHIFT INSPECTION AND ROUTINE PROCEDURES

DATE:____________________

TIME:____________________

SHIFT PERSONNEL:____________________________

ITEM	OBSERVATION	INITIALS
Natural gas / Propane pressure dryer_______psi/		
Inspect gas line and fuel train for leaks (visual)		
Check carbon adsorber temps <110 degrees F		
Inspect all conveyors for integrity of moving components		
Check the integrity of containment, empty if required		
Check LTTD WWT components and liquid piping for leaks		
Check running pumps seal flushes and verify flow		
Check carrier gas piping and APC train for leaks (visual)		
Verify Fire Extinguisher locations and volumes		
Verify the weigh belt scale is operational		
Drain and empty all buckets		
Check inventory of PPE and spill supplies		
Inspect dryer training for normal operations (visual)		
Inspect plattco valve for leaks (visual)		
Inspect drum storage (visual)		
Verify that eye wash and safety shower work		
LUBRICATION		
Grease all feed and product conveyer bearings (Monday A.M. only) YES / NO		
Grease blower bearings (Monday A.M. only) YES / NO		
Grease Dryer bearings (Monday A.M. only) YES / NO		
Grease double flap valves (discharge and cyclone) A.M. only		
Check hydraulic oil level in filter press		
Check all gear box for signs of leakage		
CALIBRATION		
Verify that analyzers have been calibrated (technician's signature)		
PAPERWORK		
Conduct daily safety briefing (supervisor's signature)		
Verify that all logged data is up to date (supervisor's signature)		
CONSUMABLES		
Emergency Nitrogen pressure _________psi		
Check polymer drum level		
Check propane tank level		
Check scrubber phosphoric acid/sodium hydroxide levels		
Check emergency generator fuel supply		
Check specialty gas cylinder level		
Check bag filter supply		
Check HEPA filter supply		
Check cooling tower scale inhibitor level		
Check cooling tower biocide level		
Record feed stock pile volumes (estimate)		
Verify treated soil bin area is adequate		

ATTACHMENTS

- **SAMPLING AND ANALYSIS PLAN**
- **QUALITY CONTROL PLAN**
- **EXCAVATION AND SOIL STAGING PLAN**
- **OFF-SITE DISPOSAL PLAN**
- **TRAFFIC AND TRANSPORTATION PLAN**
- **SECURITY PLAN**

INTERIM DRAFT
SAMPLING AND ANALYSIS PLAN

Phase IV
Tanapag Village, Island of Saipan
Commonwealth of the Northern Mariana Islands

Prepared for

Environmental / DoD Support Branch
United States Army Corps of Engineers
Honolulu Engineer District
Building 230
Fort Shafter, Hawaii 96858-5440

Contract No. DACW62-00-D-0001
Delivery Order No. 002

May 2001

Environmental Chemical Corporation
99-1151 Iwaena St.
Aiea, HI 96701

INTERIM DRAFT
SAMPLING AND ANALYSIS PLAN

Phase IV Removal Action
Tanapag Village, Island of Saipan
Commonwealth of the Northern Mariana Islands

May 2001

I hereby certify that the enclosed Sampling and Analysis Plan shown and marked in this submittal, is proposed to be incorporated with Contract Number DACW62-00-D-0001, Delivery Order 002 Tanapag Village, Phase IV. This Field Sampling Plan is in compliance with contract specifications and OSHA requirements, and is submitted for Government approval.

Reviewed by:

Project Manager Date

Project Engineer

Date

Quality Control Systems Manager Date

Accepted as a submittal:

USACE Contracting Officer Date

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

C2	Cemetery 2
CEPOD	Corps of Engineers Pacific Ocean Division
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CNMI	Commonwealth of the Northern Mariana Islands
COC	Chain-of-Custody
COR	Contracting Officer's Representative
CQCO	Chemical Quality Control Officer
CQCP	Contractor Quality Control Plan
DEI	Deionized
DEQ	Department of Environmental Quality
DI	Distilled
DoD	Department of Defense
DOT	Department of Transportation
DQCRs	Daily Quality Control Reports
DQOs	Data Quality Objectives
ECC	Environmental Chemical Corporation
EE/CA	Engineering Estimate / Cost Analysis
EPA	Environmental Protection Agency
FSP	Field Sampling Plan
IDW	Investigative-Derived Waste
ITD	Indirect Thermal Desorption
OSHA	Occupational Safety and Health Administration
PARCC	Precision, accuracy, representativeness, completeness, and comparability
PCBs	Polychlorinated biphenyls
PE	Project Engineer
PM	Project Manager
POTW	Publicly Owned Treatment Works
PPE	Personal Protective Equipment
ppm	parts per million
PRM	Program Manager
PVC	Polyvinyl chloride
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
QCM	Quality Control Manager
QCSM	Quality Control System Manager
RB	Rinsate Blank
RCRA	Resource Conservation and Recovery Act

SAP	Sampling Analysis Plan
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
SVOCs	Semi-volatile organic compounds
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TDSF	Total Dissolved Solids Facility
TNPG	Tanapag Site
TSCA	Toxic Substance Control Act
TSDF	Transfer, Storage, and Disposal Facility
TSS	Total Suspended Solids
U.S.	United States
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency

1.0 INTRODUCTION

This document presents the technical approach proposed by Environmental Chemical Corporation (ECC) for the Phase III Removal Action at Tanapag Village, on the Island of Saipan, Commonwealth of the Northern Mariana Islands (CNMI), under Contract Number DACW62-00-D-0001, Delivery Order 002. The treatment and disposal tasks of the Phase III Removal Action are designated as Phase IV work. This document is provided to support planning of the Phase IV work of the removal action.

The Draft Field Sampling Plan (FSP) has been prepared in accordance with the requirements of the December 20, 2000 Resource Conservation and Recovery Act (RCRA) Section 7003 Unilateral Administrative Order to the Department of Defense/Department of the Army to Clean up Polychlorinated Biphenyl (PCB) Contamination in Tanapag Village, Saipan (RCRA 7003 Order). It has been prepared in response to United States Environmental Protection Agency (USEPA) Region 9 comments dated 19 April 2001.

ECC has been tasked to identify all areas in Cemetery 2 (C2), and in 21 other sites at Tanapag Village and vicinity, that exceed 1 part per million (ppm) PCBs and to excavate and stockpile the contaminated materials in holding cells at C2 Site. Soil characterization, excavation, and stockpiling tasks have been completed.

1.1 Site Location

The stockpiled soils are located in Tanapag Village, which is along the northwestern coastline of the Island of Saipan, CNMI. The Mariana Islands are located in the Western Pacific at approximately Latitude 15°15'N, Longitude 145°45'E. Tanapag Village consists of approximately 1.2 square miles and is situated between West Coast Highway and Tanapag Lagoon, approximately 3 miles northeast of the Town of Garapan. Figure 1 depicts the location of the Island of Saipan and Tanapag Village in the CNMI.

Of the Phase III Sites, the largest Site excavated is located in the Main Cemetery (Cemetery 2 or C2), which is located directly between Tanapag Village and Garapan, approximately 1.6 miles northeast of the Navy Hill intersection in Garapan. C2 is a rectangular area consisting of approximately 2.3 acres. The remaining excavation Sites were in clusters throughout the Village at locations near the shoreline, inland, and to the north of the Village.

The soils excavated during the Phase III removal action from the Sites described above and in Section 1.2 are currently stockpiled in the storage cells shown in Figure 2 and are awaiting remedial action.

1.2 Summary of Removal Sites

The recent Phase III removal action and the Engineering Estimate / Cost Analysis (EE/CA) investigation have identified the Phase III Removal Sites as follows:

- Cemetery 2 – Main cemetery area and narrow areas across the road on the west and south;
- Beach/Park Areas in Tanapag Village – Sites near the shoreline, mostly in public areas;
- Public Properties in Tanapag Village – Head Start Center, Cemetery 1, and adjacent Sites;
- Private Residences – Numerous private residences, mostly within Tanapag Village; and
- Potted Plants and Planters – Sites to which soil was transported from C2.

1.3 Site History

The following site history is summarized from the Final Project Report, Remedial Action, Tanapag Village Contamination, Phase II, Tanapag, Island of Saipan, CNMI (ECC, 1999).

Soils in and around Tanapag have been contaminated with PCBs that leaked from electrical capacitors stored in the area. The affected soils include sand, crushed-coral fill, and clay. The PCB solution originally contained in the capacitors has been chemically characterized as Aroclor®1254 (Monsanto Corporation, St. Louis, MO).

The United States (U.S.) Department of Defense (DoD) had originally purchased the capacitors in the early 1960s. The United States Army Corps of Engineers (USACE) - Pacific Ocean Division , now the USACE-Honolulu District, determined in February 1991 that funding for the remediation of the Tanapag Village Site and environs qualified under DoD's Defense Environmental Restoration Program - Formerly Used Defense Sites.

The known capacitors were removed from Tanapag Village in 1988/89 by Saipan's Department of Environmental Quality (DEQ). The extent of soil contamination was partially defined by a Site Investigation project in 1990 conducted by Woodward Clyde and Associates.
In 1992 and 1993, additional site characterization was performed and contaminated soil and capacitor debris were packaged and removed from selected sites in Tanapag Village, Cemetery 2, and the Department of Public Works-Lower Base Yard. Approximately 180 tons of PCB-contaminated soil was transported to a U.S. Mainland Transfer, Storage, and Disposal Facility (TSDF) for incineration in February 1993. Although several sites were successfully remediated, a combination of poor weather and continued difficulty in defining the extent of contamination (due to the diffuse nature of the contamination) caused Corps of Engineers Pacific Ocean Division (CEPOD) to suspend further soil investigation and remediation efforts.

CEPOD estimated that further remediation would produce over 500 additional cubic yards of PCB-contaminated soil. Off-site disposal costs were deemed prohibitive; therefore, alternative solutions were investigated including on-site, in-situ treatment options. In early 1995, CEPOD authorized its contractor, Industrial Technology, to initiate a pilot study of a biotreatment approach. Pilot study results suggested that none of the five biological treatment approaches produced significant reductions or transformations in the tested soil batches.

An alternative remediation technology was sought, resulting in the selection of thermal desorption using

"Thermal Blanket" technology for the Phase II cleanup. During Phase II, 20 sites were characterized and/or remediated during the project's two-year activity period. PCB soil contamination was found in close proximity to residences, churches, schools, and surrounding burial sites at two local cemeteries. Many sites required multiple rounds of soil sampling and excavation to delineate and remove the diffuse PCB contamination to below the 10-ppm project action level.

Excavated soil was transferred to a prepared soil storage cell adjacent to the treatment area in Lower Base, where it was held prior to thermal treatment. Remediated sites were either backfilled with quarry-supplied crushed coral fill or with thermally treated soil.

Of the 20 sites investigated and/or remediated, 16 were excavated with all contamination greater than 10 ppm removed, three were confirmed free of contamination, and one, C2, is still contaminated with PCB levels greater than 10 ppm.

Numerous PCB capacitors or capacitor parts were discovered during excavation activities. The majority of these capacitors and capacitor parts were found in soil piles bordering C2. All capacitors and capacitor parts were either thermally treated or were packaged and shipped to a U.S. Mainland Total Dissolved Solids Facility (TDSF) for incineration.

Three sites in Tanapag village (LL, RR, and Z) were confirmed dioxin contaminated. In aggregate, these sites produced 74 tons of dioxin-contaminated soil. Dioxin-contaminated soil was excavated and temporarily stored in one of the four treatment cells at the treatment site in Lower Base. In July and August of 1999, this material was packaged and shipped to a U.S. Mainland TSDF for incineration.

In August of 1997, a thermal desorption system operated by TerraTherm Environmental Services was constructed at Lower Base in an area adjacent to and north of C2. Over the next year the system successfully treated 1,181 tons of PCB-contaminated soil to less than 1 ppm. In March 1999, the USACE modified the scope of work to have ECC perform a preliminary assessment of existing PCB contamination at C2. The assessment of the area showed PCB concentrations ranging from less than 10 ppm to greater than 20,000 ppm. At project demobilization, areas exhibiting levels of PCB contamination greater than 10 ppm were cordoned off with orange construction fence and posted with signs warning the general public to keep out.

In April 1999, the soil remediation approach was changed from on-site thermal desorption to off-site transport and disposal to a TSDF on the U.S. Mainland. A total of 547 tons of PCB-contaminated soil was shipped and disposed. Contaminated soil removal, site restoration, and demobilization of all site equipment was completed by August 1999.

In May 2000 the Environmental Protection Agency (EPA) collected soil screening samples in Tanapag, which have augmented the information obtained during Phase II and established new areas of PCB contamination previously not identified. ECC initiated the Phase III Removal Action characterization and excavation tasks in August 2000 and completed them in April 2001. During Phase III investigation the EPA-identified sites were expanded and additional sites were identified from information obtained from local sources and the DEQ.

The goal of Phase III is to delineate and remediate PCB contaminated soils greater than 1 ppm at the C2 and selected sites in Tanapag Village. The excavated soil will be stockpiled in soil holding cells for future treatment projected to commence in 2001.

1.4 Current Site Status

Approximately 20,000 tons of contaminated soil and debris has been placed in eleven containment cells constructed at Site C2. The materials have been secured against the elements and are underlined and covered by 30-mil polyvinyl chloride (PVC) liner and anchored by clean fill around the edges. There is PCB-contaminated soil under most of the cells that will be addressed after treatment and/or disposal of the stockpiled materials. The sampling and excavation protocols for delineating the remaining contamination will follow the procedures established in the Characterization and Excavation Work Plan (submitted under separate cover). The sequence of excavation of the in-situ contamination left at Site C2 (beneath containment cells and in the central section [Area 3] during the treatment and/or disposal phase) is addressed in the Excavation Plan.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

The project organization chart identifying key personnel, responsibilities, and lines of authority for the Tanapag Site (TNPG) is illustrated in Figure 3. Resumes of key project personnel are provided in Appendix C of the Contractor Quality Control Plan (CQCP). A brief description of the roles and responsibilities of key project personnel are described in the following sections.

2.1 Program Manager

Mr. David Cavagnol will be the Program Manager (PRM) for this project. Program Manager duties and responsibilities include the following:

- Contract execution oversight;
- Overall contract conformance to USACE requirements and specifications, including technical, cost, and schedule;
- Overall responsibility for the success and proper execution of the Contract and all task orders;
- Review all required submittals;
- Designation of the Project Manager (PM) and Quality Control System Manager (QCSM); and
- Allocation of sufficient resources to ensure successful completion of the scope of work.

2.2 Project Manager

Mr. Kevin McCaskill will be the PM for this project. Mr. McCaskill reports directly to the PRM and will officially represent the Contractor in all project-related activities. The PM duties and responsibilities include the following:

- Initiating project planning and implementing of project activities at the task order level;
- Managing the project budget and schedule with concurrence from the PRM, and ensuring Contract requirements are satisfied;
- Managing all field construction activities, including the direction of project staff and subcontractors in accordance with requirements of the Contract documents;
- Tracking proposed changes to the scope of work for the overall project;
- Communicating directly with the USACE regarding project execution and accountability;
- Coordinating with the QCSM to ensure compliance with standard protocols and procedures and implementation of the Work Plan;
- Coordinating with the Site Safety and Health Officer (SSHO) and the USACE to ensure implementation of the Site Safety and Health Plan (SSHP);
- Maintaining project logbook of activities; and
- Procuring equipment, material, and supplies.

2.3 Program Quality Control Manager

In accordance with the ECC Quality Assurance Program the Program Quality Control Manager (QCM), Mr. Keith Pushaw, has overall responsibility and authority for development and management of the Quality Control Program. He will serve as a technical advisor and resource to the QCSM.

2.4 Quality Control System Manager

The ECC QCSM for this project is Mr. Don West. Mr. West will report directly to the PRM and has the authority to act independently in all quality control (QC) matters. The QCSM duties include the following:

- Supervising all QC aspects of the project to ensure compliance with Contract plans and specifications as defined in the CQCP;
- Managing the Quality Control Program;
- Approving all submittals and supervising all QC procedures; and
- Maintaining communication between project management and project team members and acting as the primary spokesman on quality matters when interfacing with external organizations.

2.5 Chemical Quality Control Officer

The Chemical Quality Control Officer (CQCO) for the TNPG project will be Mr. Allen Beaudin. In addition to chemical QC responsibilities, Mr. Beaudin will be responsible for the collateral duties of the Chemical Data Quality Manager and report directly to the QCSM. The CQCO will be present on-site during all field-sampling activities and be responsible for the following duties:

- Coordinating and supervising all sampling activities and the development of the excavation maps;
- Interpreting chemical data results to determine the contamination levels of on-site material and the appropriate disposition of the material;
- Reviewing of the QC results of each laboratory data package;
- Preparing the sample result tables and figures; and
- Coordinating with USACE personnel regarding the chemical quality management of the project.

2.6 Site Safety and Health Officer

The SSHO for this project is Mr. Morris Riddenour who will report directly to the PRM. The SSHO will be responsible for the following:

- Implementing and enforcing the SSHP;
- Ensuring site compliance with Federal, State, and Occupational Safety and Health Administration (OSHA) safety and health regulations;
- Coordinating modifications to the SSHP with the ECC Safety and Health Manager, the Certified Industrial Hygienist (CIH), the Site Superintendent, and the USACE; and

- Maintaining the Health and Safety Logbook.

2.7 Project Thermal Engineer

The Project Thermal Engineer for this project is Mr. Allen Beaudin. Mr. Beaudin will report directly to the PM. The Project Thermal Engineer duties will include the following:

- Supervising all aspects of the Indirect Thermal Desorption (ITD) process to ensure compliance with Contract plans and specifications as defined in the ITD Plan;
- Managing the ITD process; and
- Maintaining communication between project management and project team members and acting as the primary spokesman on ITD system issues when interfacing with external organizations.

2.8 Indirect Thermal Desorption Project Engineer

The ITD Project Engineer (PE), Mr. Gregg Meyers, is responsible for the overall function of the ITD system. Mr. Meyers will be responsible for the following:

- Coordinating training and work activities of all facility personnel;
- Setting operating policies for the ITD system;
- Overseeing safety and environmental control procedures;
- Directing process controls;
- Directing the oversight and monitoring of all ITD equipment;
- Maintaining accurate operating logs, waste tracking records, training records, and computer generated reports; and
- Ensuring compliance with all Federal, State, and local regulations and laws.

Mr. Meyers will be directly responsible for all submittals for the ITD process and for assuring that all process-engineering goals are attained. Mr. Meyers will report directly to the PM.

2.9 Site Superintendent

The Site Superintendent will be Mr. Bubba Smith. The Site Superintendent will report directly to the PM. Mr. Smith will be responsible for the following:

- Directing the work performed under this contract;
- Supervising all remediation activities and field staff;
- Operating heavy equipment, personal safety, and compliance with the SSHP; and
- Ensuring all work is in compliance with the site plans and Federal, State, and local regulations governing the project; and all aspects of the Contract.

2.10 Points of Contact

Name	Title	Organization	Telephone Number
Mr. David Cavagnol	Program Manager	ECC	Pager:
Mr. Kevin McCaskill	Project Manager	ECC	Pager:
Mr. Gregg Meyers	ITD Project Engineer	ECC	Pager:
Mr. Allen Beaudin	Project Thermal Engineer	ECC	Pager:
Mr. Allen Beaudin	QC System Manager	ECC	Pager:
Mr. Bubba Smith	Site Superintendent	ECC	Pager:
Ms. Helene Takemoto	Resident Engineer, Contracting Officer's Representative	USACE	
Ms.	Contracting Officer	USACE	
Ms.	Remedial Project Manager	EPA	212/637-3914

2.11 Analytical Laboratories

The following certified laboratories will be used during the Tanapag project:

Primary	Alternate
Environmental Chemical Corporation	Severn Trent Envirotech
6954 Cornell Road, Suite 300	777 New Durham Road
Cincinnati, Ohio 45242	Edison, New Jersey 08817
Phone: 513/489-2001	Phone: 732/549-3900

Onsite Laboratory:

DEQ Office, Saipan

3.0 SCOPE AND OBJECTIVES

Remove and treat soil stored in containment cells performed in Phase III Removal Action characterization and excavation.

3.1 Work Elements

The scope of work for the Phase IV Soil Treatment and Disposal requires the following definable features of work to be completed:

- Mobilization;
- ITD Unit Demonstration Testing;
- Soil Erosion and Sedimentation Controls;
- Sampling and excavating contaminated soils from below the containment cells and soil staging areas in Site C2 in accordance with the Excavation Plan and the approved Phase III Removal Action Work Plan protocols;
- Quantity Surveys;
- On-site treatment of contaminated soils and debris by ITD and stockpiling for post-treatment confirmatory sampling;
- Backfill, grade, and compact all confirmed clean soils into excavations or final deposition location and provide additional clean fill as required to achieve final grade;
- Off-site transport and disposal of filter cake residuals to approved disposal facility;
- Treatment and/or disposal of water derived from dewatering activities; and
- Perform confirmation sampling, as required.

3.2 Chemical Data Quality Objectives

The QA objective for this project is to develop and implement procedures for obtaining and evaluating data that meet the data quality objectives (DQOs) defined in the Quality Assurance Project Plan (QAPP). QA procedures are established to ensure field measurements, sampling methods, and analytical data provide information that is comparable and representative of actual field conditions and that the data generated is technically defensible. Specifically, chemical data will be generated to determine if remediation goals and treatment criteria are achieved and to classify investigation-derived waste (IDW) for disposal. The QA objectives are defined in terms of precision, accuracy, representativeness, completeness, and comparability (PARCC) parameters, as described below. Data that meet the QA objectives and goals will be deemed acceptable. Data that do not meet objectives and goals will be reviewed on a case-by-case basis to ascertain its usefulness. When possible, corrective actions will be taken to bring data within the QA acceptability goals.

Adherence to the procedures in the QAPP will ensure that data of sufficient quality are collected during the sampling programs. The use of the QAPP allows the development and implementation of procedures for obtaining and evaluating data in a manner that will result in a quantitative and qualitative representation of the five PARCC parameters. The parameters of precision, accuracy, and completeness provide a quantitative measure of the statistical significance of the data collected in this field program. The parameters of representativeness and comparability utilize documentation of the field and laboratory procedures to qualitatively evaluate the data.

3.2.1 Precision

Precision measures the agreement among individual measurements of the same property, usually under prescribed similar conditions. Precision describes the effects random errors have on analytical measurements. Precision is the degree to which the measurement is reproducible and is usually expressed in terms of relative percent difference or standard deviation.

3.2.2 Accuracy

Accuracy is the degree of agreement of a measurement with an accepted reference or true value. The accuracy of an analytical procedure is determined by the addition of a known amount of material (matrix spike) to a field sample matrix or a standard matrix. Accuracy is used to estimate the impact of systematic errors, or biases, on analytical measurements required to make programmatic decisions.

3.2.3 Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness involves the selection of analytical methods and sampling protocols and locations such that results are representative of the media being sampled (i.e., water, soil, etc.) and of the conditions being measured. It is the qualitative parameter concerning the proper design of the sampling program.

3.2.4 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected and needed to meet the project data goals. Field completeness is assessed by comparing the number of samples collected to the number of samples planned. The completeness goal for this project is 95 percent. Analytical completeness is assessed by comparing the total number of samples with valid analytical results to the number of samples collected.

3.2.5 Comparability

Comparability is a qualitative measure of the confidence with which one data set can be compared to another data set. Comparability is achieved by using standard methods to collect and analyze representative samples and the reporting of the resulting data in standard units.

4.0 FIELD SAMPLING ACTIVITIES

This section presents the sampling strategy and technical approach to be used during the following Phase IV activities:

- Verification Soil Sampling of Areas below Soil Containment Cells and Other Contaminated Areas at Cemetery 2 Site;
- Debris Sampling for Toxic Substance Control Act (TSCA)/RCRA Disposal;
- Debris Sampling for Non-Hazardous Disposal;
- Post ITD Treatment Soil Sampling;
- Imported Fill and Top Soil Sampling;
- Contaminated Soil Sampling for RCRA Disposal;
- Water Sampling;
- Demonstration Test Sampling;
- Operational Testing; and
- Sampling Requirements for Incineration Waste Disposal .

Information provided for each of these activities includes a brief description of the field activity, media to be sampled, number and location of samples to be collected, sampling method, and field and laboratory methods to be performed. Triplicate samples will be obtained during each sampling activity for QA and QC analysis as described in Section 5.0. Table 1 provides a summary of Sampling Activities for this project. Details of the analytical requirements are presented in Table 2. Table 3 presents Practical Quantitation Limits and Remediation Goals for all parameters.

4.1 Verification Soil Sampling of Areas below Soil Containment Cells and Other Contaminated Areas at Cemetery 2 Site

The 12 soil storage cells were constructed over known or potentially contaminated areas at Site C2. The liners will be removed and packaged for disposal after the stockpiled soils are treated. Confirmation or verification sampling of the underlying soil will be performed per the previously approved soil sampling protocols for the Phase III Removal Action Work Plan and is presented below:

4.1.1 Site Characterization Sampling

The purpose of site characterization sampling is:

- To estimate the quantity of PCB-contaminated material to be excavated;
- To determine a logical progression of excavation in order to minimize cross contamination; and
- To ensure that contaminated soil is identified for excavation. .

Two established benchmarks in the road north of Cemetery 2 (TC-1 and TC-2) will be used to create a network of temporary survey control points around Cemetery 2. A total station survey instrument will

then be used to locate sample points and excavation boundaries.
The sampling will be performed on a grid system. A 10-m x 10-m grid will be used to collect three random samples per grid. This grid spacing is based on characterization data from previous phase investigations, historical information about the nature of the contamination spread and site traffic/re-grading, and a statistically-based, post-excavation follow-up sampling.

Each 10-m x 10 m grid will be divided into nine square sub-grids of equal area. A random number generator will be used to provide three random numbers between 1 and 9. The three random numbers will correspond to three of the nine sub-grids, which will be selected as locations for surface samples. Surface samples will be collected from the center of the sub-grids. A new set of three random numbers will be used for each grid.

In grids for which any sample result was reported at greater than 1-ppm PCB, adjacent grids must be established and sampled to determine the lateral extent of contamination. Additional grid layout and sampling will continue until PCB concentrations are less than 1-ppm for all samples bounding the contaminated area.

All areas with soil concentrations greater than 1-ppm will be excavated to 0.3m bgs.

4.1.2 Excavation Verification Sampling

The post-excavation survey process consists of calculating a standard deviation value sigma (δ) from the site characterization data, and using that value to calculate the number of samples required for post excavation surveys.

Generating Standard Deviation:
The site characterization data set of concentrations greater than Below Reporting Limit (BRL) and less than 1-ppm will be entered into a spreadsheet in order to calculate the standard deviation.

The Sign Test:
Since the contaminant is assumed not present in background, contamination levels are compared directly to the clean-up criteria. The Sign Test is used to determine the minimum number of data points necessary to meet the specified clean-up goals.

The combination of sampling design error and measurement error is termed as the Total Study Error. Since it is impossible to eliminate error in measurement data, two types of decision errors can occur: Type I / Type II.

A Type I error is commonly referred to as a false positive. The probability of a Type I error is denoted by alpha (α). α is sometimes referred to as the size of the test. A Type II error is commonly referred to as the false negative. The probability of a false negative is denoted by beta (β).

The probability of a Type I decision error that is tolerable falls under the 95% confidence level. Therefore, the error rate is set at 0.05 ($\alpha = 0.05$). The probability of a Type II error falls under a 90% confidence level, which equates to an error rate of 0.10 ($\beta = 0.10$).
The initial step in determining the number of data points is to calculate the Relative Shift, delta (Δ/δ). Δ is one-half of the clean-up criteria and δ is the estimation of the standard deviation from the survey unit. The survey unit is defined as the relevant data set from the site characterization data. Table 5.5 in NUREG 1575 (EPA, 1997b) lists values for the number of samples (N) for a given relative shift (Figure 9). Note that this table accounts for an additional 20% more samples to account for missing and/or unusable data.

For post-excavation survey planning, Δ is set at one-half the clean-up criteria (0.5-ppm).

The following example will be calculated using a δ set at 0.19.

Relative Shift (Δ/δ) = 0.5/0.19 = 2.63

Referring to the table in Figure 9, a relative shift of 2.63 would dictate the collection of 15 samples from each survey unit.

After the samples have been collected for each survey unit, the statistical test will be run again using analytical results from the cleanup verification samples. A new δ will be calculated, resulting in an updated relative shift. This number will be used to calculate whether enough samples were collected during cleanup verification sampling. If it is determined that an insufficient number of samples have been collected, additional samples will be collected from the survey unit that has failed. The locations of the additional samples within each of the survey units would be determined using a grid and a random number generator.

Grid Lengths:
Since the population is in random order, random-start systematic sampling, utilizing triangular grids, has been chosen for the cleanup verification sampling. Triangular grids provide more uniform coverage of the target population and yield a more accurate estimate of the mean concentration.

The surface area for the grids eligible for verification sampling, and the following equation, will be used to determine the spacing of the systematic pattern:

L = SQRT(A/.866N)

Where,

N = Number of samples
A = Surface area of grids eligible for post excavation surveys (2000 m2)
L = Spacing of the systematic pattern

Continuing with our example, if N = 15 samples (assuming a relative shift of 2.63), then L would be calculated as follows:

L = SQRT[2000/.866(15)] = 12.41 m

After L is determined, a row of sampling points is established parallel to Magnetic North, at intervals of L. A second row of points will then be developed parallel to the initial row at 0.866 x L from the first row. Sampling locations along the second row are midway between the points on the first row. Additional parallel rows of sample points will be laid out until an excavation is covered.

Due to the size and shape of some of the excavations in Cemetery 2, the sample points may not be parallel to Magnetic North, and the spacing between samples may be less than the calculated value. This will resulting in a denser verification sampling grid and a greater number of samples collected than is necessary to reach a 95 % confidence level for the cleanup, but will ensure all excavations are sufficiently sampled.

Verification samples with concentrations greater than 1-ppm will be removed. Excavation lines will be drawn midway between samples greater than 1-ppm and less than 1-ppm. All soil within these excavation lines will be excavated an additional 0.3 m bgs. The verification sample grid will be reestablished as described above and an additional round of verification samples will be collected. This process will continue until all sample concentrations are less than 1-ppm.

4.2 Debris Sampling for TSCA/RCRA Disposal

Debris to be disposed of at a TSCA/RCRA facility includes the following:

- Personal Protective Equipment;
- Disposable Sampling Equipment;
- Filter cake generated from the ITD process; and
- Spent carbon used to treat liquid from the ITD process.

Debris scheduled for TSCA/RCRA disposal will be stored in cells and covered in a central location on-site pending waste characterization and off-site disposal.

4.2.1 Location and Frequency of Sampling

One representative sample of each type of debris will be collected for waste characterization and analyzed for PCBs. One sample of the filter cake generated from the ITD process will also be collected for waste characterization and analyzed per disposal facility requirements.

4.2.2 Sampling Methodology

Environmental Chemical Corporation
99-1151 Iwaena
Aiea, HI 96701

A sample of each type of debris and one sample of the filter cake will be collected and placed in one-liter jars. Upon receipt of the jars, the analytical laboratory will grind, homogenize, and analyze the sample of debris.

4.3 Debris Sampling for Non-Hazardous Disposal

Debris classified as non-hazardous waste includes the following:

- All subsurface debris from areas outside the excavation areas;
- All above grade vegetation removed during grubbing and clearing operations;
- Concrete rubble, scrap metal, wood, etc. testing clean;
- General construction debris collected at the end of the project.

4.3.1 Location and Frequency of Sampling

Debris classified as non-hazardous waste will be stored in roll-off containers pending waste characterization. One representative sample per roll-off container will be collected and analyzed for PCBs (Table 1). Non-hazardous debris will be transported to ACE approved disposal facility within the Island of Saipan.

4.3.2 Sampling Methodology

A sample of each type of debris will be collected and placed in a one-liter jar. Upon receipt of the jar, the analytical laboratory will grind, homogenize, and analyze the sample of debris.

4.4 Post ITD Treatment Soil Sampling

Soil samples will be collected from the soil conditioner discharge and composited for analysis. Treated soil will be analyzed for PCBs to verify that remediation goals outlined in the contract specifications are met and to evaluate the treatment process efficiency. Remediation goals are presented in Table 3. In addition, analytical results for the treated soil will be used to optimize the process temperature to reduce the risk of retreatment. If analytical results exceed remediation goals, further treatment of the material will be necessary.

4.4.1 Location and Frequency

One composite sample of treated material will be collected for every 250 cubic yards of untreated contaminated soil entering the process. The composite sample will be split into triplicate samples, placed into three one liter jars, and labeled A, B, and C. All three samples will be sent to the laboratory. Initially, Sample A will be analyzed. If analytical results for Sample A meet remediation criteria, then the stockpile will be used for backfill. If analytical results for Sample A exceed remediation criteria, then Samples B and C will be analyzed for analytes not meeting the criteria.

If both Sample B and C fail to meet remediation criteria, the pile fails and will be retreated. If either Sample B or Sample C fail, then an eight point composite sample will be taken from the stockpile and analyzed for the analyte that failed to meet the criteria. If the eight point composite sample meets the remediation criteria, then the stockpile will be used for backfill. If the eight point composite sample fails to meet the remediation criteria, then the stockpile will be retreated. Figure 5 provides a flowchart showing this decision process.

4.4.2 Sampling Methodology

Initially, eight grab samples will be collected directly from the radial stacker inlet (one point every 50 tons of feed). These samples will be homogenized and composited in a stainless steel bowl to form Samples A, B, and C. If Samples B or C fail to meet the remediation criteria, an eight-point sample will be taken directly from the stockpile. The stockpile will be visually divided into equal parts, a grab sample collected from each part, composited in a stainless steel bowl, and transferred to sample jars for analysis. Samples will be handled and packaged as described in Section 7.0. A 48-hour turn around time for PCB analysis is required for these samples in order to enable ITD personnel to evaluate the efficiency of the treatment process. Duplicate and triplicate split samples will be obtained for the required QA and QC analysis.

4.5 Imported Fill and Topsoil Sampling

Material transported to the TNPG for fill will be initially tested to ensure the backfill is free of chemical contamination.

4.5.1 Location and Frequency of Sampling

A grab sample of the fill material will be collected at the fill and topsoil material source and analyzed for PCBs. One grab sample will be collected for every 5000 cubic yards of fill material delivered to the TNPG. Analytical testing for topsoil will be repeated for each new source of material. In addition, fill material will be subjected to geotechnical testing as described in the CQCP.

4.5.2 Sampling Methodology

A grab sample of the fill material will be collected using a stainless steel scoop or shovel and transferred to sample containers.

4.6 Water Sampling

Water generated from the following activities will be collected, stored in bladder tanks or constructed impoundments, and sampled:

- Dewatering of test pit and excavation areas;
- Surface runoff collected from around the test pit and excavation areas; and
- Decontamination operations.

4.6.1 Location and Frequency of Sampling

Prior to introducing the water stored in the tanks into the ITD process, one sample from each tank will be collected and analyzed for Total Dissolved Solids (TDS), Total Suspended Solids (TSS), and PCBs.

A sample of source water used for decontamination operations and the ITD system will be analyzed for PCBs. Effluent water from the ITD system will be sampled and analyzed for PCBs prior to reuse on-site for dust control. Water generated from the final decontamination of the ITD system, ITD pad, and equipment, will be analyzed for PCBs prior to off-site disposal either to the Publicly Owned Treatment Works (POTW) or the TSCA/RCRA permitted facility, as appropriate.

4.6.2 Sampling Methodology

Water samples will be collected from the tank with a Teflon disposable bailer using the following sampling methodology:

- Slowly lower the bailer into the storage container until it comes in contact with the water surface;
- Allow the bailer to sink and fill with minimum surface disturbance;
- Slowly raise the bailer to the surface. Do not allow bailer line or the bailer to contact the ground;
- Open bottom drain and allow a slow steady flow and fill specified sample bottles ; and
- Process samples as described in Section 7.0.

Source water and ITD effluent water samples will be collected from the point of discharge directly into sample containers.

4.7 Demonstration Test Sampling

Effluent soil samples will be collected during the demonstration test and analyzed for PCBs, semi-volatile organic compounds (SVOCs), and Toxicity Characteristic Leaching Procedure (TCLP) RCRA metals. Samples will be used to assess the efficiency of the ITD process.

4.7.1 Location and Frequency of Sampling

Over the duration of the project, seventeen effluent soil samples will be collected from the ITD system point of discharge, the radial stacker.

4.7.2 Sampling Methodology

Grab samples will be collected from the effluent point of discharge using a stainless steel scoop and transferred to sample containers.

4.8 Operational Testing

Operational testing will include periodic analysis of the feed material for PCBs and moisture content. Sample frequency for operational testing will be determined in the field by the ITD Engineer and coordinated with the Contracting Officer's Representative (COR). Data will be used to optimize the performance of the ITD system. Grab samples will be collected using a stainless steel scoop from the feed stockpile, composited in a stainless steel bowl, and transferred to sample jars.

4.8.1 Location and Frequency of Sampling

Periodic analysis of the feed material for operational testing will be performed when deemed necessary by the ITD Engineer.

4.9 Sampling Requirements for Incineration Waste Disposal

PCB oils from the clarification process will be collected for transport to an off-site disposal facility and incinerated. Samples will be collected for waste profiling purposes and analyzed for TCLP characteristics. Samples will be collected using a disposable bailer and transferred to sample jars.

4.10 Analytical Requirements, Sample Containers, and Preservation Requirements

Table 2 lists analytical requirements, containers to be used, preservation requirements, and the maximum holding time allowable before samples are extracted and/or analyzed. The laboratory will supply sample containers and add the required preservatives as listed in Table 2 prior to shipping the sample containers to the site. Sample packaging and shipping are discussed in Section 7.0 of this document.

5.0 FIELD QUALITY ASSURANCE AND QUALITY CONTROL SAMPLES

A series of quality samples will be collected in the field and submitted for analysis. QA and QC samples will represent at least 10% of the field samples. Every tenth sample will be collected in sufficient volume to provide three portions. One portion will be identified as the field sample, one as the QC duplicate sample, and the third as the QA triplicate sample. These samples are analyzed for the purpose of assessing the quality of the sampling effort and the analytical data.

5.1 Quality Assurance Samples

QA samples are triplicate samples of the field samples collected. These samples are sent to the USACE QA laboratory and analyzed to evaluate contractor laboratory performance. One QA sample for every 10 field samples will be analyzed by:

Attn: Denise Macmillan
Missouri River Division Laboratories
420 South 18th Street
Omaha, NE 68102-2586
Contact Phone Number: (402) 444-4304

Field personnel coordinate weekly with the QA laboratory to discuss the sample shipment Schedule and to obtain Laboratory Information Management System (LIMS) numbers. Field personnel will also inform the QA laboratory if a shipment is canceled and of plans to ship samples on Friday for Saturday pickup.

5.2 Quality Control Samples

QC samples are those samples collected in duplicate that will be submitted to ECC's laboratory as blind samples. QC samples will be analyzed for the same parameters as the field sample. Results from these samples will be compared to data from the appropriate field sample to assess the consistency and quality of data produced from the laboratory. The QC samples will be sent to the following laboratory:

Primary	*Alternate*
Contact: Brady Bigelow *ECC Cincinnati Laboratory* *3235 Omni Drive* *Cincinnati, Ohio 45245* *Telephone: (513) 752-2950*	

5.3 Field Duplicate and Triplicate Samples

Field duplicate and triplicate samples are samples collected in quantity at the same time, location, and under the same conditions as the original sample. Field duplicate or triplicate samples are used to estimate the overall precision of a data collection activity. Duplicate and
Triplicate samples are collected at the same time and homogenized in the field so they are equally representative of sample conditions at a given point in space and time. The homogenized sample is split into a field sample, a QC sample, and a QA sample.

5.4 Field Blanks

Field Blanks are prepared in the field by filling sample containers with deionized (DEI) water under field conditions. Field blanks evaluate the presence of airborne contaminants at the site and/or contamination inherent to sample containers.

5.5 Rinsate/Equipment Blanks

Rinsate or Equipment Blanks are samples of distilled (DI) water poured over decontaminated sampling equipment. The rinsate blank is collected during the final rinse of the sampling equipment after decontamination procedures are performed. Rinsate blanks are analyzed for the same parameters as field samples to evaluate the effectiveness of field decontamination procedures.

5.6 Temperature Blanks

Temperature Blanks are bottles of water packaged in each sample cooler, allowing the laboratory to determine the temperature of the shipment without disturbing the field samples. One temperature blank is placed in each cooler.

5.7 Sample Containers and Preservation Procedures

All samples collected will be preserved according to EPA protocols established for the parameters of interest. Appropriate measures will be taken to ensure that requirements with respect to temperature are maintained during transport to the laboratory, and prior to log-in and storage at the laboratory. ECC will follow the procedures recommended by USACE in "Chemical Data Quality Management for Hazardous Waste Remedial Activities, ER1110-1-263", for sample handling and preservation.

Sample preservation, container, and holding time requirements were identified based on EPA-SW846 protocols (EPA, 1986, 1992, 1994d). These requirements are summarized in Table 2. The analytical laboratory will supply the sample bottles, containers, and preservatives. Sample bottles and containers will be free of target analytes and of known quality (i.e., I-Chem 200 series or equivalent), as documented by the container manufacturer.

5.8 Equipment Decontamination

Equipment decontamination will be performed before and after sample collection at each sampling location. All sampling equipment will be decontaminated as follows:

- Cleaned with non-phosphate surfactant using a brush, if necessary, to remove particulate matter and surface films, rinsed in distilled water, and rinsed in a 1 percent acid rinse;
- Rinsed a final time with DI water and allowed to air dry;
- Sampling equipment will be completely wrapped in aluminum foil, shiny side out, to prevent contamination during transportation;
- Clean disposable gloves will be worn while handling sampling equipment during the final stages of decontamination. DI water will be stored in glass or Teflon containers and applied via Teflon squeeze bottles; and
- Equipment or materials not used immediately after decontamination will be placed on a plastic sheet, covered with plastic, and secured to avoid potential contamination.

6.0 DOCUMENTATION REQUIREMENTS

A sample is physical evidence collected from a site or facility. Due to the possible evidentiary nature of the samples collected during investigations, a stringent program of custody procedures will be utilized to ensure that each sample is accounted for from the time of collection to analysis. Documentation in logbooks and chain-of-custody (COC) records will be employed to maintain a comprehensive record of the sample collection, transfer between personnel, shipment, and receipt by the laboratory.

A critical aspect of sound sample collection and analysis protocols is the maintenance of strict COC procedures. Specific procedures are to be followed to maintain and document sample possession. A sample is considered to be in an individual's custody if the sample is:

- In the physical possession or view of the responsible party;
- Secured to prevent tampering; or
- Placed in a restricted area by the responsible party.

This section outlines the procedures that will be followed to document sample history and integrity.

6.1 Field Logbook

A bound field logbook will be used to document all field operations and will contain sufficient data and information to reconstruct field activities for a specific day. Pages in the logbook will be bound and numbered. All entries will be recorded legibly in indelible ink. At the end of each day, the last page will be signed and dated by the author(s) and a line drawn through the remainder of the page. At a minimum, the daily log will contain:

- Date and time the field work started;
- Names and titles of sampling personnel;
- Purpose of the sampling;
- Location and description of the sample and sample site;
- Date and time each sample was taken;
- Any deviations from the Sampling and Analysis Plan (SAP);
- Meteorological conditions at the start of sampling and changes in these conditions;
- Record of any field measurements taken;
- The number and type of samples taken and the sample numbers;
- Packaging information; and
- Sample destination.

Errors on field documents will be corrected by drawing a line through the error and entering the correct information. The person who made the original entry should correct errors on a field document, and the erroneous information should not be obliterated. All corrections will be initialed and dated.

6.2 Photographs

Color photographs will be taken of remediation activities to record important features of the site prior to the commencement of work, during remediation activities, and after work is complete. A camera-lens system with a perspective similar to the naked eye will be used; telephoto or wide-angle photographs are not suitable for legal purposes. Before work begins, a minimum of 10 exposures will be taken, including views of the general site, excavation areas, wetlands, and the ITD area. After remediation activities have been started, the project will be photographically recorded as it progresses. In addition, at least one photograph will be taken from the same overall view at successive periods during the project. After completion of work, a minimum of 10 photographs will be taken including an overall view of the remediated site. The following information about each photograph will be recorded in the field logbook:

- Photographer's name;
- Date and time of the photograph;
- General camera direction;
- Brief description of the subject and the field work portrayed in the photo; and
- Film roll number of the photograph.

6.3 Video

Before remediation activities begin, a video camera will be used to document site conditions. The video will be recorded on a VHS tape and will be used to assess the degree of damage created by trucking activities.

6.4 Sample Designation

Every sample will be given a unique sample designation for identification purposes.
The numbering system will be coordinated with the QCSM, the PM, and the COR to ensure that the proposed sample identifiers are discrete. The sample identification will be a series of letters and numbers consisting of three or four character strings identifying the specific sample as follows:

TNPG-huh-xaaa

TNPG Refers to Tanapag Village Remediation
"hhhh" is the unique identification assigned to each sampling location:

EA =	Excavation Area	SW =	Source Water
DC =	Drum Contents	EF =	ITD Effluent
DS =	Debris Sampled	FD =	Final Decontamination
IF =	Imported Fill	EW =	Excavation Water
PT=	Post Treatment	WW =	Waste Water
MS =	Metals contaminated soil	IL =	Inline Air Monitoring

FT = Water samples from frac tanks
DT = Demonstration Testing
OT = Operational Testing
IW = Incineration Waste
UW = Up wind (air monitoring)
DW = Down wind (air monitoring)
SC = School Zone (air monitoring)
WZ = Work Zone (air monitoring)

“x” describes the sample matrix:
1 = soil
2 = water/liquid
3 = debris
4 = Air

“aaa” represents the sample number

For example: Sample No.TNPG-EA01-1001 indicates that the sample is:

- For Tanapag Village;
- Collected at the TNPG, excavation area 01; and
- Soil sample 1.

All logbooks, sample labels/tags, custody seals, representative sampling documents, and COC documents will be completed using these sample designations. QC samples will be assigned unique sample designations in the same way as field samples. A two-digit designation will be added at the end of the sample number to identify the QC samples in the field logbook. For example: TNPG-EA-01-1001-QC.

QC = Quality Control sample
QA = Quality Assurance sample
RB = Rinsate Blank sample

The additional two digit QC designation will not be placed on the sample jars or the COC record; therefore, the QC samples will not be identified as such to the laboratory.

6.5 Sample Label

A sample label, as presented in Figure 6, will be attached to each sample container and completed legibly with indelible ink. The sample labels will be affixed to the sample bottle and covered with clear tape. The labels will identify the name/initials of the collector, date and time of sample collection, place of collection, sample number, analysis required, preservatives added, and designation between grab and composite samples.

6.6 Custody Seal

The custody seal, as presented in Figure 7, will be attached to the outside of the shipping container in such a manner that the seal must be broken to allow access to the container. The following information will be entered on each custody seal in the field:

- Sample collection date; and
- Sampler's signature.

6.7 Chain-of-Custody Record

The COC record (Figure 8) will accompany all sample transfers or shipments to identify its contents. This record will be used to document sample custody transfer from the sampler to other sampling team members and finally to the ECC on-Island analytical laboratory. The COC record ensures that samples can be traced from the time of field collection until they are received and analyzed by the analytical laboratory. The original custody record is shipped along with the samples, while the initiator of the record retains a copy. The information required for the COC record includes:

- Type of sample (grab or composite) and matrix;
- Analytical method numbers and parameter names;
- Sample number;
- Signature of sampler;
- Date and time of sample collection;
- Project name, location, and address; and
- Signatures of persons involved in the chain of possession.

When responsibility for a group of samples changes several times, each custodian is not required to retain a copy of the COC record, as long as the original custody record indicates that each person accepting the samples has subsequently relinquished custody appropriately. COC forms will be completed according to the following protocol:

- The originator fills in all requested information from the sample labels;
- The originator signs the "Relinquished by" box and keeps the copy;
- The original record sheet is shipped with the samples. A plastic shipping envelope will be taped to the inside of the cooler top and the remaining two copies of the COC record will be filed with the Representative Sampling Documents;
- The person receiving custody checks the sample label information against the custody record. He/she also checks sample condition and notes anything unusual under "Remarks" on the custody form;
- The person receiving custody signs in the "Received by" box and keeps

the original;

- The Date/Time will be the same for both signatures, since custody must be transferred between two individuals; however, when samples are shipped via common carrier (e.g., Federal Express), the date/time will not be the same for both signatures;
- When samples are shipped via common carrier, the original custody form is shipped with the samples and the shipper (e.g. Field Sample Custodian) keeps the copy. The shipper also keeps all shipping paper, bills of lading, etc.;
- In all cases, it must be readily seen that the person receiving custody has relinquished it to the next custodian; and
- If samples are left unattended or a person refuses to sign, this must be documented and explained on the COC record.

7.0 PACKAGING AND SHIPPING OF SAMPLE CONTAINERS

7.1 Packaging of Samples

Standard samples for laboratory analysis will be placed in containers and preserved as described in Table 2. ECC will follow the procedures recommended by USACE in "Chemical Data Quality Management for Hazardous Waste Remedial Activities, ER1110-1-263" for sample packaging to off-Island laboratories as follows (protocols will exclude packing materials and shipping forms for samples transferred to the ECC on-Island analytical laboratory):

- Samples will be placed in glass jars with Teflon lids;
- Each sample container will be placed inside a self-sealing polyethylene bag. Sample containers will be kept upright in the cooler, with a minimum one-inch space between sample containers;
- Three-inches of inert, absorbent, packing material (vermiculite) will be placed at the bottom of the cooler;
- Samples will be placed in water proof metal or insulated plastic coolers;
- An additional layer of inert packing material will be placed in the cooler to partially cover the sample containers;
- A temperature blank will be placed in the cooler immediately adjacent to the sample containers;
- Double-bagged ice packs will be placed around the sample container to provide uniform cooling during shipping. At least three ice packs will be used per cooler;
- All remaining space in the cooler will be filled with a packing material to provide stability during transport;
- The COC record will be placed in a self-sealing polyethylene bag and taped to the inside lid of the cooler;
- The shipping container will be closed and taped shut with duct tape or strapping tape. The drain of the cooler will be shut and sealed with duct tape;
- Custody seals will be placed over the seam at the front and rear of the cooler lid and covered with clear tape;
- The completed shipping label will be placed on the top of the cooler (see Section 7.3); and
- The shipper’s hazardous certification form will be completed prior to shipping.

7.2 Shipping Containers for Standard Samples

All samples sent to the off-Island laboratory for analysis will be shipped via Federal Express. Samples will be properly classified to assure the protection of personnel involved in the shipment of samples and to maintain the integrity of the samples. The packaging, labeling, and shipping of hazardous substances are regulated by the International Air Transport Association, Resolution 618, effective January 1, 1992. Samples shipped from the TNPG will comply with these requirements. The PM (or designated representative) will contact the laboratory as necessary to inform them of incoming samples, arrival time, and special handling or analytical procedures required. Samples will be delivered to the laboratory within 48 hours of sample collection.

7.3 Marking/Labeling of Shipping Containers

Clearly print in indelible ink the following information in unabbreviated form on a label attached to the shipping container:

- Laboratory name and address; and
- Return name and address.

Each shipping container will be labeled with "Environmental Samples" and "This End Up" stickers on the top, upward arrows on all four sides, and Fragile stickers on at least two sides.

8.0 INVESTIGATION DERIVED WASTES

IDW from the remedial activities will consist of water generated from decontamination activities, used personal protective equipment (PPE), and disposable sampling equipment. IDW will be managed in accordance with EPA guidance for Management of IDW during Site Inspections (1992) and other applicable guidance.

IDW will be stored in an on-site location designated by the COR. The IDW staging area will be inspected daily by ECC personnel during the field program. IDW will be treated, or otherwise disposed of in accordance with the Waste Management Plan.

8.1 Solid Wastes

Measures will be taken to control the generation of excess waste. Trash and construction debris will be picked up and containerized for disposal. Two (2) cubic yard trash bins will be set up in the administrative area for domestic rubbish. These containers will be emptied on a regular basis. The site will be cleared upon completion of the project.

Green waste (leaves, branches, grass, etc.) generated from any needed clearing and grubbing activities and those that are included in the existing soil stockpiles will be disposed of in the local landfill or as the USACE directs. Suspect materials will be stored in roll-off containers pending analytical characterization and disposed of as described in the Off-Site Disposal Plan. The ITD treated material will be sampled and analyzed as described in Section 4.0. After the confirmation testing is completed, the ITD tested material will be used to backfill the excavation areas.

8.2 Liquid Wastes

All contaminated water, including water collected from dewatering activities, surface runoff, and rinsate from personnel and equipment decontamination, will be collected and stored in Department of Transportation (DOT) approved (49 Code of Federal Regulations [CFR] 178) frac tanks. Samples will be collected and analyzed for waste characterization as described in Section 4.6.

.

9.0 CHEMICAL QUALITY CONTROL

Chemical QC consists of three phases (preparatory, initial, and follow-up) of control that will be performed for the sampling activities.

9.1 Preparatory Phase

The QCSM and the sampling team will discuss sampling requirements for the project as described in Section 4.0 of this FSP. Each sampler will be given a copy of Table 1, a summary of the required sampling activities. The preparatory session will include a discussion of the following:

- Review of site hazards, both chemical and physical;
- Review of the PPE required during sampling;
- Review of the sampling techniques to be used;
- Examination of the required sampling equipment and materials; and
- Review of the decontamination procedures.

The following equipment will be used during the sampling activities:

- Stainless steel spoon or trowel;
- Stainless steel bowl;
- Teflon Bailers;
- Sampling jars and bottles, as indicated in Table 2;
- Disposable gloves;
- Tyvek suits;
- DI water stored in glass or plastic containers for decontamination;
- Non-Phosphate liquid surfactant for decontamination;
- Isopropyl alcohol for decontamination;
- Bagged ice for sample preservation;
- Shipping labels for sample containers;
- Custody seals for sample coolers;
- Packing Material; and
- Aluminum foil for wrapping sampling equipment for storage.

To conclude the preparatory phase, the QCSM will conduct a walk-through of the sampling areas with personnel performing remediation and sampling activities. This phase will be repeated for new sampling personnel added to the team.

9.2 Initial Phase

During the initial phase, the QCSM will supervise the initial sampling of each definable feature of the sampling activities to ensure the required sampling procedures are followed.

9.3 Follow-up Phase

The follow-up phase requires the QCSM to review the progress of sampling activities to ensure compliance with all sampling methods. Supervision of the sample packaging and shipping, as described in Section 7.0, is part of the follow-up phase of chemical QC.

10.0 DAILY QUALITY CONTROL REPORTS

Daily Quality Control Reports (DQCRs) will be prepared from field sampling notes, observations, and audit reports for each day of the project in which field activity occurs. The following information will be noted on the DQCRs:

- Job and site numbers;
- Location of work;
- Weather conditions including temperature, wind speed and direction, barometric readings, significant wind changes, etc.;
- Description of work performed including QA/QC samples collected and calibration information;
- Problems encountered and associated corrective action;
- Description of field tests performed, including the individuals performing the tests, test results, QC check results, and calibration procedures;
- Results of audits or inspections, including problems identified and corrective actions taken;
- Signature of responsible authority and initials of all persons conducting changes or corrective actions; and
- General comments.

The laboratory will provide ECC with DQCRs that report out-of-control analytical events. These will contain the following:

- Hold time violations;
- COC discrepancies;
- Sample storage and preservation errors;
- Out of control QA/QC sample results; and
- Corrective actions taken as a result of the above problems.

Field and laboratory DQCRs will be assembled and provided to the USACE COR on a weekly basis.

11.0 ECC FIELD LABORATORY

The majority of the samples that will be taken to characterize contamination at the various sites will be analyzed at the field laboratory setup within the DEQ laboratory. This will eliminate sample shipment time and provide rapid analytical results so the project can proceed without the threat of down time.

11.1 Scope and Applications

ECC will utilize a gas chromatographic (GC) procedure with electron capture detector (ECD) and capillary column applicable to the determination of Arochlor 1254. During Phase II sampling, Arochlor 1254 was determined to be the only Arochlor of concern at the Tanapag sites. The ECC field laboratory will only analyze samples for Arochlor 1254.

This procedure is applicable to soils and sediments. The following policies will be adhered to for all analytical work.

- Soil samples are extracted within 14 days holding time from sampling date;
- Any sample with extract concentration over the calibration curve (1,000-ppb) is diluted to bring sample value into the curve range; and
- If a positive identification is made for more than one PCB in a sample, then peaks that are not common to the two PCB must be used for quantitation.

11.2 Definitions

The following is a list of definitions that will aid in the understanding of the procedures to be used for the on-site analytical:

- <u>Extraction Batch</u> - A group of 20 or fewer samples of similar matrix which are extracted together by the same person within the same time period using the same reagents. Each extraction batch will be uniquely identified and include appropriate QC as specified in this Standard Operating Procedure (SOP);
- <u>Analytical Batch</u> - A group of samples that are analyzed together within the same run sequence in the same or continuous time periods. Each analytical batch will contain the appropriate standards and will be uniquely identified;
- <u>Continuing Calibration</u> - Analytical standard run every 10 injections to verify the calibration of the GC/ECD system;
- <u>Duplicate</u> - Two aliquots of the same sample analyzed using identical procedures. Analysis of duplicates monitors precision associated with laboratory procedures;
- <u>Instrument Blank</u> - An injection of the pure solvent (in this SOP it will be hexane) used in preparation of final standards and sample extracts. This is done to determine solvent purity and instrument system cleanliness;
- <u>Initial Calibration</u> - Analysis of analytical standards for a series of different specified

concentrations; used to define the linearity and dynamic range of the response of the electron capture detector to the target compounds;

- Matrix - The predominant material of which the sample to be analyzed is composed. For the purpose of this SOP, a sample matrix is either water or soil/sediment. Matrix is not synonymous with phase (liquid or solid);
- Matrix Spike - Aliquot of a matrix (water or soil) fortified (spiked) with known quantities of specific compounds and subjected to the entire analytical procedure in order to indicate the appropriateness of the method for the matrix by measuring recovery;
- Matrix Spike Duplicate - A second aliquot of the same matrix as the MS (above) that is spiked in order to determine the precision of the method;
- Method Blank - An analytical control consisting of all reagents, internal standards and surrogate standards that is carried through the entire analytical procedure. The method blank is used to define the level of laboratory background and reagent contamination. At least one method blank per extraction batch will be analyzed;
- Reagent Water - Water in which a contaminant is not observed at or above the minimum quantitation limit of the parameters of interest;
- Surrogates (Surrogate Standard) - Compound added to every blank, sample, MS/MSD, and standard; used to evaluate analytical efficiency by measuring recovery. Surrogates are brominated, fluorinated, or isotopically labeled compounds not expected to be detected in environmental media; and
- Target Compound List - A list of compounds designated by the client for analysis.

11.3 Equipment and Materials

The following is a list of the materials and equipment needed on-site to perform sample analysis, including the reagents and calibration standards:

- 1 GCs - Hewlett Packard 6890 equipped with auto-sampler and an ECD;
- Column: Column 2, DB-1701, 30m X 0.32 mm; film thickness 0.25u;
- Analytical Balance - Mettler AE 160 capable of accurately weighing 0.0001 grams;
- Glassware;
- Vials - Glass 10 to 15 mL capacity, with Teflon-lined screw cap;
- Funnels;
- Volumetric Flask - 10 and 25 mL cap with Teflon cap;
- Autosampler vials and crimp caps;
- Beakers - 250 mL;
- 50 mL glass columns;
- Microsyringe - 10 micro-liter (µL), 25 µL, 50 µL, 100 µL, and 1000 µL gas-tight. Purchased to be + 1% of total volume;
- Pasteur pipettes – disposable;
- Water - demonstrated to be free of contaminants. De-ionized and/or distilled water created using an Elga™ water purification system;

- Hexane and acetone-pesticide or High Performance Liquid Chromatography grade;
- Sodium sulfate - granular, anhydrous, sodium sulfate;
- Sulfuric Acid;
- Stock Standard Solutions - Stock standard solutions are purchased as certified solutions from Supelco™, Ultrascientific™, and/or Accu Standard™;
- Surrogate Standards are purchased as certified solutions from Ultrascientific™, Supelco™, and/or Accu Standard™. Surrogate mix contains 2, 4, 5, 6-Tetrachloro-m-xylene and Decachlorbiphenyl; and
- Calibration curve for Aroclor 1254 will be prepared at a minimum of 5 concentration levels by adding volumes of one or more stock standards to a volumetric flask and diluting to volume with hexane.

  Level 1 - 100 μg/L
  Level 2 - 200 μg/L
  Level 3 - 500 μg/L
  Level 4 - 800 μg/L
  Level 5 - 1000 μg/L

11.4 Gas Chromatograph Conditions

The following lists the conditions under which analysis will be run using Column DB1701 on a Hewlett Packard 6890 GC with dual injection ports, auto-samplers, an integrator and two ECDs.

Column DB1701
Flow Rate - 3 mL/min
Injection Temp. - 250 °C
Detector Temp. - 350 °C

Hewlett Packard 6890 GC
Initial Temperature - 150°C
Initial Time - 0.5 min.
Rate - 8°/min.
Final Temperature - 280 °C
Final Time - 10 min.

11.5 Analytical Procedures

The sequence in which the analysis will be performed is listed below:

Hexane blank
(1) Aroclor 1254-1
(2) Aroclor 1254-2

(3) Aroclor 1254-3
(4) Aroclor 1254-4
(5) Aroclor 1254-5
(6) Calibration check containing Aroclor 1254 [500 micrograms per liter (μg/L) mid point curve]
(7) Samples up to 10
(8) Hexane blank
(9) Calibration check containing Aroclor 1254

11.6 Sample Extraction for Solid Samples

The following steps are performed in order to extract the PCB from a solid matrix:

1. Weigh 10 grams of solid sample into a beaker.
2. Mix sodium sulfate with sample until free flowing.
3. Place a plug of glass wool in a 50-mL glass column.
4. Pour sample into the column and place beaker under the column.
5. Spike samples with surrogate and LCS, MS, MSD with spike solution.
6. Pass 50-mL of a 1:1 hexane/acetone solution through the column collecting it in the beaker used to weigh out the sample.
7. After sample has drained, pour approximately 100-mL of DI water in beaker.
8. Pipette off the top hexane layer into a 40-mL screw cap vial.
9. Acid-clean all samples. Place a small amount of sample in a 4-mL screw cap vial. Then add 1 pipette (disposable) of H_2SO_4 to vial cap and shake. Then pipette off top hexane layer into an auto-sampler vial for analysis.

11.7 Sulfuric Acid Cleanup

This procedure is used to remove contaminants from solution. It does not appreciably effect the PCB concentration.

1. Using a disposable pipette, transfer 1 or 2 mL of the hexane extract to a 5-mL vial. Carefully add 1 or 2 mL of sulfuric acid to the vial (sulfuric acid volume should be the same as the amount of hexane used). This should be done in a fume hood.
2. After the acid is added, mark where the top of the hexane layer is on the vial with a marker.
3. Cap the vial and shake vigorously for one minute.
4. Allow the phases to separate for at least 1 minute. Examine the top (hexane) layer; it should not be highly colored nor should it have a visible emulsion or cloudiness. In addition, notice where the hexane layer is in regards to the original mark made on the vial. If the layer is less than 1/2, the original hexane layer thickness, this should be noted in the extraction book and noted in the analytical results.
5. If a clean phase separation is achieved, pipette the top hexane layer into an auto-sampler vial for analysis.
6. If the hexane layer is colored or emulsion persists for several minutes, remove the sulfuric acid layer

from the vial and dispose of it properly. Then add another 1 or 2 mL of sulfuric acid. Shake and allow to separate.

7. If a clean phase separation is achieved, pipette the top hexane layer into an auto-sampler vial for analysis.
8. All extracts for PCB analysis are "cleaned-up" using this procedure, including all QC samples associated with a batch.

11.8 Quality Control Procedures

These procedures will be utilized to ensure quality control of the analysis.

- The calibration curve must consist of 5 standards for all analytes and surrogates. Curve must have a Relative Standard Deviation (RSD) of 20% or less;
- The calibration curve is checked by a calibration check at the beginning, every 10 samples, and at the end of the analytical run, and must be within ±15% of the true value. Calibration check standards are also ran after the initial calibration;
- A reagent blank sample must be run on the instrument at the beginning of every experiment to demonstrate the reagents are free from contamination and before each calibration check;
- A method blank must be carried through the whole extraction and analysis procedure with every batch;
- An MS/MSD, LCS and a duplicate must be run with every batch to demonstrate the continuous reproducibility of the method; and
- Extracts must be stored in a refrigerator in the dark and analyzed within forty days of extraction.

11.9 Corrective Action and Responsibilities

- The calibration curve should have an RSD of less than or equal to 20% on each compound. If the calibration curve does not pass, redo the calibration curve;
- The calibration check standards must pass by ± 15% of the true value. If they do not, try injecting a new calibration check. If it still does not pass, run a new calibration curve. Samples may need to be re-run in the event that a calibration check standard failed; and
- The GC operator is responsible for the above corrective action.

11.10 Documentation

The Lab notebook will contain the following information:

- GC conditions;
- Sample numbers;
- Weight;
- Final Volume;
- Dilution factor;
- Sample results;

- Notebook and page number for standards;
- What if any clean up was done on a sample; and
- date of analysis and person performing analysis.

Standard Preparation will include the following information:

- Identification (ID) number;
- Date opened;
- Compound name;
- Source, manufacturer and lot number or ECC ID number;
- Certificate of analysis number;
- Manufacturer expiration date;
- Initial concentration;
- Weight/volume used;
- Final volume;
- Final concentration;
- Solvent and ID number;
- Expiration date;
- Prepared by, date; and
- Check by, date.

The Extraction Log-in Book will contain the following information:

- sample identification;
- Client/work order number;
- Volume/weight of sample;
- pH;
- Color;
- Final volume;
- Comment about extraction (any problems that may occur);
- Batch number;
- Technician (who prepped the samples);
- Date of extraction;
- Date concentrated;
- Amount of surrogate and matrix spike solution used, the ID number for each solution, and notebook and page number for the prep of each solution;
- A reviewed by signature;
- Date analyzed; and
- A relinquished to signature and date and time sample extract were relinquished.

11.11 Calculations

Surrogates are compounds that are added to every blank, sample, MS/MSD duplicate and standard. They are used to evaluate analytical efficiency by measuring percent recovery. The calculations are based on response factor (RF) values of the calibration curve.

Solid Sample:

SC (µg/L) x FV (L) x DF = Surrogate Concentration [micrograms per kilogram (µ/kg)]
weight of sample [kilogram (kg)]

Where:

SC = Sample Concentrations from the computer
FV = Final Volume
DF = Dilution Factor

Response Factor Calculation:

Standard Concentration = RF
Area of curve

Relative Standard Deviation Calculation:
Standard deviation x 100 = % RSD
Average RF

Calculation for Multi-Peak Compounds:

- Identify the compound by comparing the sample pattern with the standards pattern;
- Pick several peaks that are the same in the standard and sample. The same peaks must be used for all standards and samples;
- Add up the area of all peaks to be used for that standard and samples;
- Calculate the RF value for each standard as previously shown; and
- Calculate % RSD as previously shown. % RPD must be < 20%.

Multi-Peak Compound Soil Sample Calculation:

Area of sample x Average RF = Sample Concentration from curve (µg/L)

SC (µg/L) x FV (mL) x DF = Surrogate Concentration (µg/kg)
Weight of sample (kg)

Where:

SC = Sample Concentrations from the computer
FV = Final Volume

DF = Dilution Factor

11.11.1 Miscellaneous Notes and Precautions

Method interference may be caused by contaminants in solvents, reagents, glassware, and other sample processing hardware that lead to discrete artifacts and/or elevated baselines in GCs (phthalate is an example).

11.11.2 Confirmation Techniques for Single-column Gas Chromatograph

Confirmation technique for single column is as follows per EPA Method 8082 section 7.7.3.

"When samples are analyzed from a source known to contain specific Arochlors, the results from a single-column analysis may be confirmed on the basis of a clearly recognizable Aroclor pattern. This approach should <u>not</u> be attempted for samples from unknown or unfamiliar sources or for samples that appear to contain a mixture of Arochlors. In order to employ this approach, the analyst must document:

* The peaks that were evaluated when comparing the sample chromatogram and the Aroclor standard.
* The absence of major peaks representing any other Aroclor.
* The source-specific information indicating that Arochlors are anticipated in the sample (e.g., historical data, generator knowledge, etc.)."

Since the site is known to contain Arochlors we don't need to confirm the Aroclor 1254 on a second column. Pattern recognition is a form of confirmation when the site is known to contain Arochlors.

11.12 References

- SW-846, EPA Method 8000A; and
- SW-846, EPA Method 8082.

11.13 Modifications to SW-846, EPA Method 8082

There are two modifications to the EPA method used by the ECC field laboratory.

- The extraction method described in Section 12.2.5 is not an EPA method; and
- The ECC field laboratory did not perform a Method Detection Limit (MDL) study.

11.14 Safety Precautions

The following safety precautions will be adhered to during all analytical activities in the field laboratory.

<u>Work and Hygienic Practices</u>:

- Wear gloves, lab coat, and eye protection;

- Handle material in an approved fume hood and work in a properly ventilated area;
- DO NOT take solvents internally;
- Eye wash and safety equipment should be readily available; and
- Wash thoroughly after handling samples and chemicals.

First Aid Measures:

- Get medical assistance for all cases of overexposure.
- If Hexane or CH_2Cl_2 touches skin, wash thoroughly with soap and water.
- If eyes come in contact with solvent immediately flush with water for at least 15 minutes.
- If solvent has been ingested do NOT induce vomiting. Get immediate medical attention.
- If solvent has been inhaled, remove to fresh air. If breathing has stopped give artificial respiration.

Exposure Limits:

- During 15 minutes, the exposure of CH_2Cl_2 should not exceed 1000-ppm. At NO time should the exposure exceed 2000-ppm; and
- During an 8-hour day, the average exposure to hexane cannot exceed 500-ppm. During an 8-hour day, the average exposure to acetone cannot exceed 1000-ppm.

12.0 CORRECTIVE ACTIONS

The following sections briefly discuss field and laboratory corrective actions in response to detected deficiencies.

12.1 Field Corrective Actions

Any sampling problems or deficiencies (i.e., improper sampling, decontamination, or packaging procedures) detected during the initial or follow-up phases of quality control will be corrected immediately. After corrective actions are taken, the follow-up phase of quality control will be intensified until the QCSM is satisfied that the problem is permanently corrected. The USACE will be notified as soon as possible concerning sampling problems or deficiencies and any corrective actions taken. The information will also be recorded in the DQCR.

12.2 Laboratory Corrective Actions

When an out-of-control situation is detected, the analyst and laboratory PM will investigate to determine the cause and document the actions taken. Data acquired concurrently with this condition are discarded and samples re-analyzed unless the investigation of the problem proves that the analysis was in control. Corrective actions are discussed in section 11.0.

After the corrective actions are instituted, the systems performance is rigorously checked before continuing sample analysis. No analysis is started if the calibration check samples are outside of the acceptable limits. The problem is diagnosed, the system fixed, and the calibration rechecked before analysis is resumed. Corrective actions associated with the project are documented and records are maintained in the laboratory maintenance book.

FIGURES

Table 5.5 Values of N for a Given Relative Shift (Δ/σ), α, and β when the Contaminant is Not Present in Background

	α=0.01					α=0.025					α=0.05					α=0.10					α=0.25				
	β					β					β					β					β				
Δ/σ	0.01	0.025	0.05	0.10	0.25	0.01	0.025	0.05	0.10	0.25	0.01	0.025	0.05	0.10	0.25	0.01	0.025	0.05	0.10	0.25	0.01	0.025	0.05	0.10	0.25
0.1	4095	3476	2984	2463	1704	3476	2907	2459	1989	1313	2984	2459	2048	1620	1018	2463	1989	1620	1244	725	1704	1313	1018	725	345
0.2	1035	879	754	623	431	879	735	622	503	333	754	622	518	410	258	623	503	410	315	184	431	333	258	184	88
0.3	468	398	341	282	195	398	333	281	227	150	341	281	234	185	117	282	227	185	143	83	195	150	117	83	40
0.4	270	230	197	162	113	230	1921	162	131	87	197	162	136	107	68	162	131	107	82	48	113	87	68	48	23
0.5	178	152	130	107	75	152	126	107	87	58	130	107	89	71	45	107	87	71	54	33	75	58	45	33	16
0.6	129	110	94	77	54	110	92	77	63	42	94	77	65	52	33	77	63	52	40	23	54	42	33	23	11
0.7	99	83	72	59	41	83	70	59	48	33	72	59	50	40	26	59	48	40	30	18	41	33	26	18	9
0.8	80	68	58	48	34	68	57	48	39	26	58	48	40	32	21	48	39	32	24	15	34	26	21	15	8
0.9	66	57	48	40	28	57	47	40	33	22	48	40	34	27	17	40	33	27	21	12	28	22	17	12	6
1.0	57	48	41	34	24	48	40	34	28	18	41	34	29	23	15	34	28	23	18	11	24	18	15	11	5
1.1	50	42	36	30	21	42	35	30	24	17	36	30	26	21	14	30	24	21	16	10	21	17	14	10	5
1.2	45	38	33	27	20	38	32	27	22	15	33	27	23	18	12	27	22	18	15	9	20	15	12	9	5
1.3	41	35	30	26	17	35	29	24	21	14	30	24	21	17	11	26	21	17	14	8	17	14	11	8	4
1.4	38	33	28	23	16	33	27	23	18	12	28	23	20	16	10	23	18	16	12	8	16	12	10	8	4
1.5	35	30	27	22	15	30	26	22	17	12	27	22	18	15	10	22	17	15	11	8	15	12	10	8	4
1.6	34	29	24	21	15	29	24	21	17	11	24	21	17	14	9	21	17	14	11	6	15	11	9	6	4
1.7	33	28	24	20	14	28	23	20	16	11	24	20	17	14	9	20	16	14	10	6	14	11	9	6	4
1.8	32	27	23	20	14	27	22	20	16	11	23	20	16	12	9	20	16	12	10	6	14	11	9	6	4
1.9	30	26	22	18	14	26	22	18	15	10	22	18	16	12	9	18	15	12	10	6	14	10	9	6	4
2.0	29	26	22	18	12	26	21	18	15	10	22	18	15	12	8	18	15	12	10	6	12	10	8	6	3
2.5	28	23	21	17	12	23	20	17	14	10	21	17	15	11	8	17	14	11	9	5	12	10	8	5	3
3.0	27	23	20	17	12	23	20	17	14	9	20	17	14	11	8	17	14	11	9	5	12	9	8	5	3

TABLES

INTERIM DRAFT
CONTRACTOR QUALITY CONTROL PLAN

Phase IV
Tanapag Village, Island of Saipan
Commonwealth of the Northern Mariana Islands

Prepared for

Environmental / DoD Support Branch
United States Army Corps of Engineers
Honolulu Engineer District
Building 230
Fort Shafter, Hawaii 96858-5440

Contract No. DACW62-00-D-0001
Delivery Order No. 002

May 2001

Environmental Chemical Corporation
99-1151 Iwaena St.
Aiea, HI 96701

INTERIM DRAFT
CONTRACTOR QUALITY CONTROL PLAN

Phase IV
Tanapag Village, Island of Saipan
Commonwealth of the Northern Mariana Islands

May 2001

I hereby certify that the enclosed Contractor Quality Control Plan, shown and marked in this submittal, is proposed to be incorporated with Contract Number DACW62-00-D-0001, Delivery Order 002, for Phase IV, Tanapag Village, Island of Saipan, Commonwealth of the Northern Marianas. This Contractor Quality Control Plan is in compliance with contract specifications and OSHA requirements, and is submitted for Government approval.

Reviewed by:

Project Manager	Date
Project Engineer	Date
Quality Control Systems Manager	Date

Accepted as a submittal:

USACE Contracting Officer	Date

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ACRONYM S AND ABBREVIATIONS

ASTM	American Society for Testing and Material
CO	Contracting Officer
COR	Contracting Officer's Representative
CQC	Contractor Quality Control
CQCP	CQC Plan
DFW	Definable Feature of Work
ECC	Environmental Chemical Corporation
ECRA	Environmental Cleanup Responsibility Act
EPA	Environmental Protection Agency
FIO	For Information Only
FFS	Focused Feasibility Study
GA	Government Approval
MIS	Management Information System
MSDS	Material Safety Data Sheet
NCR	Nonconformance Report
PCBs	Polychlorinated Biphenyls
PM	Project Manager
PRM	Program Manager
RCRA	Resource Conservation and Recovery Act
RFI	Request for Information
QA	Quality Assurance
QC	Quality Control
QCSM	QC System Manager
QCM	QC Manager
SAP	Sampling and Analysis Plan
SOW	Scope of Work
SSHP	Site Safety and Health Plan
SSHO	Site Safety and Health Officer
TSCA	Toxic Substance Control Act
USADEH	United States Army Engineer District, Honolulu

1.0 INTRODUCTION

This Draft Work Plan (WP) has been prepared in accordance with the requirements of the December 20, 2000 RCRA Section 7003 Unilateral Administrative Order to the Department of Defense/Department of the Army to clean up polychlorinated biphenyl contamination in Tanapag Village, Saipan (RCRA 7003 Order). It is prepared for review and comment by USEPA, Region 9, and is subject to revision pursuant to USEPA comments.

Between August 2000 and April 2001, the Army excavated about 20,000 tons of contaminated soils in and around Tanapag Village, particularly at Cemetery II. These soils have been stockpiled and secured within eleven cells at the project site. The purpose of this WP is to address the manner in which these contaminated soils and debris will be treated to reduce the presence of PCBs in them to the action level of 1 part per million (1ppm) or less. Soils and debris that can not be treated to the action level will be removed.

The WP generally reflects the language at pages 7 - 9 of the RCRA 7003 Order which indicates that the Army will implement an indirect thermal desorption (ITD) process to remove the PCBs from the stockpiled soils and debris. The ITD process has been used successfully at other PCB cleanup projects and the Army presented a briefing of the ITD process to the CNMI DEQ and interested Tanapag residents in May of 2000. The Army is also preparing a focused feasibility study (FFS or study) of various alternatives for the treatment of PCB contaminated soil and debris, including but not limited to ITD. At the conclusion of this study, the Army will publish a proposed plan for the treatment of soil and debris at Tanapag for public review and comment. Public comment on this proposed plan will help the Army and the USEPA to refine and select the final treatment methodology. The Army expects to complete the FFS not later than June 15, 2001 and to publish the proposed plan for public comment shortly thereafter. The FFS is being prepared in accordance with the public participation requirements of the RCRA 7003 Order and 10 USC 2701, in a manner subject to and consistent with Section 120 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA).

This document presents the technical approach proposed by Environmental Chemical Corporation (ECC) for the Removal Action at Tanapag Village, on the Island of Saipan, Commonwealth of the Northern Mariana Islands, under Contract Number DACW62-00-D-0001, Delivery Order 0002. The treatment and disposal tasks of the Phase III Removal Action are designated as Phase IV work. This document is provided to support planning of the Phase IV treatment and disposal activities.

Environmental Chemical Corporation's EC Clean™ is an in-direct heated thermal desorption system (ITD) or also a class of low temperature thermal desorption system for removing polychlorinated biphenyl (PCB) contaminants from soil without combustion or burning. Indirect heating assures that burning of wastes does not occur. The desorption process heats the soil in a dryer and boils contaminants off soil particles rendering soil clean. The treated soil meets the residential reuse standard for fill. The contaminants in vapor form are removed from the dryer and are further refined to a small solid PCB waste stream. The concentrated PCB's can be shipped off the Island to a processing or disposal facility.

1. 1 Purpose

This Contractor Quality Control Plan (CQCP) outlines the planned quality control (QC) procedures that ECC personnel and subcontractors will follow during this project, and is the foundation of the QC system. The primary function of QC management is to ensure tasks are performed in accordance with approved plans and specifications, and within the defined schedule and budget. This is achieved through the execution of a realistic plan to ensure that the required standards of quality will be met, precluding problems resulting from poor quality.

ECC will only consider this plan to be in effect after receiving formal written acceptance by the Contracting Officer (CO). ECC understands that acceptance of the plan is conditional and will be based on continued compliance with the contract specifications. ECC acknowledges that the CO may require changes or periodic updates to the CQCP to maintain contract compliance.

1. 2 Quality Control Objectives

The QC objectives for this project are to establish and describe the QC management system and documentation of the control mechanisms at each phase of the project, including excavation, sampling and analysis, thermal treatment, and waste management. This plan will define the QC management structure, their responsibilities, authorities, and the QC procedures to achieve the project objectives. ECC staff and subcontractors are responsible for performing quality work and implementing the QC program, achieved through a cooperative effort and commitment to quality.

The CQCP specifies the inspection and testing requirements utilizing the Three Phases of Control system. While the CQCP provides the QC procedures for all phases of work, specific requirements are presented in associated documents. Those plans include the Site Safety and Health Plan (SSHP), the Sampling and Analysis Plan (SAP), the Indirect Thermal Treatment (ITD) Plan, the Traffic and Transportation Plan, the Off-Site Disposal Plan, the Site Security Plan, and the Excavation and Soil Staging Plan.

ECC will maintain responsibility of its work and the work of its subcontractors by:

- Maintaining qualified personnel, equipment, and facilities for this project; and
- Providing an inspection program to examine the quality of materials, maintain standards of workmanship, ensure remediation and construction standards, evaluate unit performances, identify and correct deficiencies, and provide finished products that meet or exceed the contract requirements.

2.0 PROJECT DESCRIPTION

PCB-contaminated soils and associated debris has been sampled, characterized, excavated and stockpiled in holding cells at the Main Cemetery Site (Site C2) at Tanapag Village in Saipan. Some in-situ contaminated soils exist below the holding cells and in a central staging area (Area 3) of Site C2. The proposed Treatment and Disposal of these materials are presented as Phase IV tasks and will be implemented after regulatory and public review and acceptance.

2. 1 Site Description

The stockpiled soils are located in Tanapag Village, which is along the northwestern coastline of the Island of Saipan, CNMI. The Marianas Islands are located in the Western Pacific at approximately Latitude 15°15'N, Longitude 145°45'E. Tanapag Village consists of approximately 1.2 square miles and is situated between West Coast Highway and Tanapag Lagoon, approximately 3 miles northeast of the Town of Garapan. Figure 1 depicts the location of the Island of Saipan and Tanapag Village in the CNMI.

Of the Phase III Sites, the largest Site excavated is located in the Main Cemetery (Cemetery 2 or C2), which is located directly between Tanapag Village and Garapan, approximately 1.6 miles northeast of the Navy Hill intersection in Garapan. C2 is a rectangular area consisting of approximately 2.3 acres. The remaining excavation Sites were in clusters throughout the Village at locations near the shoreline, inland, and to the north of the Village.

The soils excavated during the Phase III removal action from Phase III excavations are currently stockpiled in the storage cells at Site C2, the proposed treatment site. The recent Phase III Removal Action sites have been identified as follows:

- Cemetery 2 (C2) – Main cemetery area and narrow areas across the road on the west and south;
- Beach/Park Areas in Tanapag Village – Sites near the shoreline, mostly in public areas;
- Public Properties in Tanapag Village – Head Start Center, Cemetery 1, and adjacent Sites;
- Private Residences – Numerous private residences with lots in Tanapag Village; and
- Potted Plants and Planters – Sites to which soil was transported from C2.

2. 2 Site History

In the late 1960s, surplus military equipment (that included used electrical equipment) from Kwajalein Atoll, was brought to Saipan. After arriving on island, the surplus equipment was stored at the Public Works Yard (PWY) located at the southernmost end of Tanapag Village in an area referred to as Lower Base (Edward K. Noda and Associates 1999).

Between 1968 and 1974, an unknown number of electrical capacitors were transported from PWY to Tanapag Village, following a request by Mr. Hosei (Joe) Norita (who subsequently became Village Commissioner of Tanapag) to use the capacitors in the Village to form a perimeter around the Village

ballpark/community hall area. Some of the electrical capacitors were also used for a barricade against vehicles entering the Village through Tanapag Beach Park.
While the exact year that the capacitors were placed in Tanapag Village is not known, several older residents recall their arrival after Typhoon Jean hit the island in 1968-69, and before Mr. Norita became Village Commissioner of Tanapag in 1974. Individuals who were involved in transporting and placing the capacitors in Tanapag Village, including several Boy Scouts for whom Mr. Norita served as troop leader, recall that the capacitors were brought into the Village in 1972. As a result of a typhoon that struck Saipan in the late 1970s, the capacitors became scattered throughout the Village (Edward K. Noda and Associates 1999).

According to a CNMI Division of Environmental Quality (DEQ) Internal Briefing Paper (1991), DEQ was notified of the presence of numerous cylindrical electrical components in Tanapag Village in December 1988. Upon notification, DEQ field technicians conducted an investigation by collecting samples of the liquid contained within the cylinders. These samples were then sent to Guam's Environmental Protection Agency for chemical analysis. Test results showed that approximately 60 percent of the samples had very high concentrations of PCBs, i.e., in excess of 5,000 milligrams per kilogram (mg/kg) (the federal action level is 50 mg/kg) (Edward K. Noda and Associates 1999).

In 1988, a USEPA Technical Assistance Team proceeded to remove the capacitors from Tanapag Village, bringing them to the PWY for storage in 55-gallon drums to await proper disposal. A total of 53 capacitors were removed in 1988; another two were removed from the Village by DEQ in 1991 (Woodward-Clyde Consultants 1993). The capacitors (Type LX100R) are cylindrical ceramic vessels containing phenolic windings soaked in Aroclor (PCB mixture) and are approximately 4 feet long with an 18-inch diameter.

The USEPA Region IX Office of the Pacific Islands and Native American Programs determined that the capacitors found in Tanapag Village were manufactured for military use. USEPA correspondence identified Cornell-Dubilier Electrical Corporation as the manufacturer of the capacitors found at Tanapag Village (letter from Jim Branch (USEPA) to Cornell-Dubilier on December 20, 1988). The U.S. military subsequently purchased the capacitors from Continental Electronics of Texas. According to Cornell-Dubilier, the capacitors were used in the U.S. Army's Nike-Zeus radar system to operate high-frequency transmitters in Dallas, New Mexico, and Kwajalein. Global Construction Company dismantled system equipment on Kwajalein in April 1967. Based upon USEPA's findings, the U.S. Department of Defense agreed to conduct limited response actions related to the capacitors that EPA had collected and placed in the storage area at Tanapag Village under Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS) authority (Edward K. Noda and Associates 1999).

2. 3 Previous Investigations

The U.S. Army began a preliminary assessment of Tanapag Village and initiated removal of the capacitors from Saipan in 1990. In August 1992, the Army initiated Phase I soil removal from Tanapag Village at Site locations identified during preliminary assessment sampling activities, including the Lower

Base Yard Excavation. Off-site disposal of 180 tons of PCB-contaminated soils mixed with capacitor debris was completed during Phase I.

In March 1994, the Army began Phase II of the response action and removed an additional 1,730 tons of contaminated soil from Tanapag Village and C2. This soil was treated on-site using a Thermal Blanket Process and PCB Destruction by a thermal oxidation process. Remediated Sites were backfilled with quarry-supplied crushed, coral fill, or the treated soil. Approximately 4,000 cubic yards of contaminated soil was left in place at C2 and covered by a layer of crushed coral. Five hundred and forty nine tons of soil was disposed of off site (U.S. mainland). Twenty Sites were identified during Phase II. The C2 Site was the only remaining Site with PCB contamination greater than 10 parts per million (ppm).

USEPA collected additional soil samples identifying new areas of PCB contamination in May 2000. Phase III of the project initiated shortly thereafter with ECC performing characterization at various sites in Tanapag Village, under the direction of USACE. Phase III included excavation of all identified PCB-contaminated soils and stockpiling of the material from approximately 23 Sites identified during Phase III removal activities. The volume of contaminated soil stockpiled and awaiting treatment and/or disposal is approximately 20,000 tons.

The three phases of investigations focused primarily on PCBs. Isolated pockets of PCBs were identified in soil with concentrations detected in excess of 100,000 ppm; however, typical concentrations were below the 10 ppm range occurring in small clusters around Tanapag Village. In addition, limited testing for dioxins and dibenzofuran was completed at three Sites. Dioxin concentrations slightly above 50 parts per billion (ppb) were identified at two Sites. Dioxin-contaminated soil (approximately 74 tons) was excavated and temporarily stored in a treatment cell at the Lower Base area. This material was eventually shipped to the U.S. mainland for incineration in August 1999.

3.0 SECTION 1 SITE CHARACTERISTICS

3. 1 Definable Features of Work

The scope of work (SOW) for the Phase IV Removal Action requires the following definable features of work (DFW):

- Mobilization and site setup to include soil erosion and sedimentation controls, if required;
- ITD unit demonstration testing;
- Pre-removal and post-treatment surveys;
- Excavation and stockpiling of contaminated soils from cells for on-site treatment in accordance with the Excavation and Soil Staging Plan;
- Materials Handling
- Quantity surveys;
- On-site treatment of contaminated soils and debris by ITD and stockpiling;
- Confirmation and Verification sampling;
- Backfill and compacting, or grading of confirmed clean soils into designated areas, as required;
- Off-site transport and disposal of ITD residual wastes and contaminated soils to approved disposal facility.
- Site Security

Temporary erosion control will be implemented using surface runoff control methods. Permanent erosion control will be achieved with the restoration of the site.

4.0 QUALITY CONTROL ORGANIZATION

This section describes the roles, responsibilities, and authorities of project personnel associated with the project. The project organization chart identifies the structure, areas of responsibility, and the lines of authority within ECC's project management and QC organization, and is included as Figure 1. The CQCP will be implemented independently of the quality assurance (QA) oversight performed by representatives of the United States Army Corps of Engineers (USACE).

4. 1 Program Manager

The ECC Program Manager (PRM), Mr. Dave Cavagnol, is responsible for executive oversight and overall conformance of the project to USADEH requirements and specifications, including the technical, cost, and schedule. Mr. Cavagnol has the overall responsibility of successful and proper execution of the contract and all task orders. This responsibility includes reviewing all required submittals, designating the Project Manager (PM) and Quality Control System Manager (QCSM), and allocating sufficient resources for proper completion of all elements of work in accordance with the approved plans. The PRM also has primary responsibility for tracking and reporting any proposed changes to the SOW to the PM, QCSM, and the CO's Representative (COR). Mr. Cavagnol interfaces directly with the USADEH regarding contract execution and accountability, and is the primary point of contact for the contract.

4. 2 Project Manager

The ECC PM, Mr. Kevin McCaskill, organizes the assigned project staff and initiates project planning and implementation activities at the Task Order level. The PM reports directly to the PRM and is responsible for ensuring that all project activities conform to USADEH requirements and specifications. The PM controls the budget and schedule, with the concurrence of the PRM, ensuring the contract requirements are met. Mr. McCaskill is responsible for managing all field construction and treatment activities related to the SOW, including work by subcontractors. PM duties also include the preparation of project planning reports.

4. 3 Program Quality Control Manager

In accordance with the ECC Quality Management Program, the Program Quality Control Manager (QCM), Mr. Keith Pushaw, has overall responsibility and authority for development and management of the Programmatic QC Plan. He will serve as a technical advisor on quality-related matters and resource to the QCSM.

4. 4 Quality Control System Manager

The ECC QCSM, Mr. David Steele, is responsible for supervising all QC aspects of the project to ensure compliance with contract plans and specifications. The QCSM reports to the PRM and is responsible for overall management of the QC Program in the field, having the authority to act independently in all QC matters. A copy of the QCSM appointment letter is included in the CQCP as Appendix D. The appointment letter describes the responsibilities of the QCSM and delegates the authority to the QCSM, including authority to stop work when work does not meet the contract specifications. Generally, the QCSM is responsible for:

- Assuring that this CQCP is implemented for the SOW; and
- Conducting regular inspections and tests; and
- Reporting the status and adequacy of the QC Program to the QCM, the PM, and the PRM.

As supervisor of the QC Program, the QCSM approves all submittals and supervises all QC procedures. The QCSM maintains communications between project management and project team members and acts as primary spokesman on quality matters when interfacing with external organizations. Some tasks include:

- Identify quality problems;
- Initiate, recommend, or provide solutions to quality problems through designated channels;
- Identify the need for corrective action;
- Verify implementation of solutions and corrective actions;
- Assure that further processing, delivery, installation, or use of items or services are controlled until proper disposition of a nonconformance, deficiency, or unsatisfactory condition has occurred;
- Halt work, if work is not in compliance with the contract requirements;
- Certify that all submittals are in compliance with contract requirements; and
- Assure that all certifications provided by others (e.g., equipment and material vendors or suppliers) are accurate and in compliance with contract requirements.

4. 5 Chemical Quality Control Officer

The Chemical Quality Control Officer is Mr. Allen Beaudin, who reports directly to the QCSM. In addition to chemical QC responsibilities, Mr. Beaudin is responsible for the collateral duties of the Chemical Data Quality Manager. The Chemical Quality Control Officer is responsible for coordinating and supervising all sampling activities and developing the excavation maps. Mr. Beaudin will be on the site during all sampling activities and will interpret chemical data results to determine contamination levels and the appropriate disposal requirements. As the Chemical Data Quality Manager, Mr. Beaudin will review the QC results of each laboratory data package, prepare the sample result tables and figures, and coordinate with USACE personnel regarding the chemical quality management of the project.

4. 6 Quality Control Staff

The QC staff is individuals who are experienced in QC inspection and testing. QC staff reports directly to the QCSM. The QCSM will provide letters of direction to all QC personnel outlining their roles and responsibilities. Copies of these letters will be furnished to the USADEH prior to the fieldwork. A qualified member of the QC staff will be assigned as an alternate QCSM in the potential absence of the QCSM. The period of absence may not exceed two weeks at a time, and no more than 30 working days during a calendar year.

4. 7 Supplemental Personnel

Supplemental QC personnel may be available for QC functions when such needs dictate. When the complexity of the task warrants specialized personnel to assist in QC activities, such personnel will be assigned the responsibility for the particular activity. These personnel will be have the necessary education and/or expertise to ensure contract compliance, and will be on site during their areas of responsibility. For example, a chemical data engineer will only perform QC activities related to evaluation and/or acceptance of chemical data, and will not be permitted to inspect soil or mechanical components. When used for quality management purposes, supplemental personnel report directly to and take direction from the QCSM.

4. 8 Subcontractors

ECC requires its subcontractors to adhere to the CQCP in addition to the SSHP, including the provisions of EM 385-1-1 (September 1996). Acceptance of these plans and policies is in written form. In addition, ECC requires subcontractors to have their own QC procedures specific to the type of work performed. Appropriate subcontractor QC plans and procedures directly affecting project work will be documented and written copies maintained on-site. All QC functions will be coordinated through the QCSM and documented in daily reports. While on-site, all subcontractor personnel will be under the supervision and preview of the QCSM and PM. Subcontractor deficiencies will be recorded in the same manner as ECC deficiencies on the Daily Quality Control Report.

These conditions are documented in the subcontractor agreements prior to the start of any fieldwork. Although ECC may delegate the work of establishing and executing certain portions of the CQCP, ECC will retain the responsibility of the QC program.

4. 9 Organizational Changes

Changes to the CQC organization require the CO's acceptance. Changes will be submitted in writing seven days prior to the proposed change. Requests shall include the names, qualifications, duties, and responsibilities of each proposed replacement. All such changes to QC staff and notification/acceptance of the CO will be routed through the PM.

5.0 THREE PHASES OF CONTROL

The QCSM is responsible for implementing the core of the Quality Management System, the Three Phase Control system, to ensure that all project work complies with requirements of the contract plans and specifications. The Three Phases of Control will be implemented for each DFW delineated in the work plan. These phases are described as follows, with required actions listed for each phase.

5. 1 Preparatory Phase

The preparatory phase will be performed prior to a DFW. The QCSM will notify the COR at least 48 hours before beginning any of the required preparatory phase inspections. This phase will include a meeting conducted by the QCSM and be attended by the Site Safety and Health Officer (SSHO), the superintendent, other QC personnel (as applicable), and the foreman responsible for the DFW. The results of the preparatory phase inspections will be documented by completing the Preparatory Inspection Form and attached to the Daily Quality Control Report. ECC will inform workers of the acceptable level of workmanship required for meeting contract specifications. The preparatory phase inspection will include the following:

- Review applicable specifications, contract plans, and governing regulations;
- Ensure that all materials and/or equipment are on-site, conform to the specifications, were tested and approved for use;
- Review the testing plan and institute the required QC inspection and testing;
- Examine the work area to ensure that the required preliminary work is completed;
- Review the SSHP and appropriate activity hazard analysis to ensure that applicable safety requirements are met and that required material safety data sheets (MSDS) were submitted;
- Present construction methods and QC procedures, including elimination of repetitive deficiencies, documenting tolerances, and workmanship standards; and
- Check that plans are accepted by the CO.

5. 2 Initial Phase

The initial phase will be accomplished at the beginning of each DFW. The QCSM will notify the COR at least 48 hours before the initial phase inspection. The QCSM will ensure that the personnel responsible for the DFW are instructed on the acceptable level of workmanship. The QCSM will document the results of the initial phase inspection by preparing the Initial Inspection Form, and attaching it to the Daily Quality Control Report. The following will be accomplished during the initial phase inspection:

- Check preliminary work to ensure that it is in compliance with contract and task order requirements;
- Review minutes of the preparatory meeting;
- Establish the level of workmanship required;
- Resolve conflicts;

- Check site and personnel safety to ensure compliance with the SSHP and the appropriate activity hazard analysis; and
- Ensure that inspections and testing are scheduled.

The initial phase must be repeated for each new crew starting work on site, or if acceptable quality standards are not maintained.

5. 3 Follow-Up Phase

During each DFW, the QCSM or QC personnel will perform daily checks to ensure continuing compliance with the contract requirements, including control testing, until the completion of the DFW. The inspections and/or tests will be documented and included in the Daily Quality Control Report. Final follow-up checks will be conducted and all deficiencies corrected prior to the start of the next DFW. The follow-up checks will include the following:

- Ensure the work is in compliance with contract requirements;
- Check site and personnel safety to ensure compliance with the SSHP and the appropriate activity hazard analysis;
- Ensure the quality of workmanship required is maintained;
- Ensure that scheduled testing is performed; and
- Ensure that nonconforming work is corrected.

The QCSM may hold additional preparatory and initial phase meetings on the same DFW if the quality of the work is unacceptable, if there is a change order for that specific activity, or if other problems develop.

5. 4 Deficiency Tracking

Deficiencies may be identified at any stage of the Three Phases of Control process. Defects and deficiencies identified will be recorded in the Daily Quality Control Report. Once identified, defects and deficiencies will be monitored closely until resolved through re-work, replacement, or other required performance. The status of each deficiency will be recorded on the Daily Quality Control Report until resolved. No additional work that builds on the deficient item will be permitted until the deficiency is corrected.

5. 5 Safety Inspections

The SSHO will perform daily safety inspections throughout the project. The inspections will evaluate site operations and will be reported daily in the Daily Quality Control Report that will be faxed or delivered to the COR. In addition, the SSHO will conduct daily safety meeting with all site personnel. This meeting is documented using the Daily Safety Tailgate Meeting form. This form will be attached to the Daily Quality Control Report and sent to the COR daily. All ECC QC and Safety and Health personnel are adequately experienced and trained to identify and correct any deficiencies in site operations. Deficiencies and corrections will be duly noted on the Daily Quality Control Report. Information noted will include the area of deficiency, type of deficiency, corrective action to be taken or which was taken, the responsible party for corrective action, date of follow-up inspection(s), and signature of the investigating QCSM.

All on-site inspections will be considered a matter of record for each project. The inspections will be filed in ECC's QC files and submitted in the appropriate contract formats. In addition, summary tables will be presented to facilitate contract reporting.

5. 6 Completion Inspection

The QCSM will conduct completion inspections of all DFWs to verify that the work performed meets the requirements of plans, specifications, quality, workmanship, and completeness. These include:

- <u>QC Completion Inspection</u> - Based on the USACE's concurrence that the work is nearing completion and prior to the pre-final inspection, the QC staff conducts a detailed inspection for conformance to requirements. The COR is notified of the inspection date so he may participate. An itemized deficiencies list is prepared identifying items that do not conform to plans and contract specifications. The list is submitted to the USADEH. All deficiencies will be corrected within five (5) days of the inspection.

- <u>Pre-Final Inspection</u> - Notice will be given to the USADEH 14 days prior to the Pre-Final Inspection. The notice includes assurance that all specific items previously identified as being unacceptable along with all remaining contract work will be completed by the date scheduled for the Pre-Final Inspection.

- <u>Final Acceptance Inspection</u> - Notice is to be given to the USADEH 14 days before the Final Acceptance Inspection and will include assurance that all specific items previously identified as being unacceptable, if any, along with all remaining work performed under the contract is complete and acceptable by the date scheduled for the Final Acceptance Inspection.

5. 7 Inspection Activities

The different types of QC inspection activities, performed under the CQCP, include:

- <u>Field Inspections</u> - Primarily visual examinations, but may include measurements of materials and equipment being used, techniques employed, and the final products. These inspections confirm that a specific guideline, specification, or procedure for the activity is successfully completed. They are performed either during remediation and/or construction, or shortly after completion of the work. The results will be documented in the Daily Quality Control Report.

- Field Tests - Tests or analyses made in connection with the site activities. They are performed primarily on samples or construction in-progress to determine whether the project requirements are being met. Field tests are performed upon receipt of the material to provide prompt confirmation or rejection of the material. Construction work in-progress is tested to minimize the potential of removing future construction added to defective material or work.

- Laboratory Tests - Testing performed by on-site or off-site laboratories on samples of materials that are used to characterize the materials and confirm performance. These tests are performed as soon as possible after samples are obtained in order to provide prompt confirmation or rejection of the material or the constructed work.

- Receiving Inspections - Inspections that include a visual examination and measurement of materials obtained from suppliers when they arrive at the site. They are performed to verify that the materials received meet design specifications, are free of defects, and were not damaged in transit.

- Surveys - Surveying includes the establishment of horizontal and/or vertical grade control for construction, establishment of elevation benchmarks, reference/location surveys for structures, and topography, as appropriate.

- Review of Manufacturers' Certificates - Certificates obtained from suppliers for selected shipments of materials received are reviewed by the QCSM. Certificates include a statement of the requirement that the material must meet, and verification that the material meets the requirements, and supporting test results.

- Compilation of Checklists - Checklists required for critical inspections and filled out to document inspection results. These checklists are maintained by the QC System Manager.

6.0 SUBMITTAL CONTROL

ECC will submit the items listed on the Submittal Register (ENG Form 4288) and any submittals required by the contract specifications by complying with the contract requirements. The QCSM will check and approve each submittal and will complete its transmittal form (ENG Form 4025).

6. 1 Submittal Procedures

The Submittal Register is included in Appendix E. The Submittal Register will be maintained by the QCSM. The Submittal Register and progress schedules will be coordinated and updated as requested. Listings will be grouped by section number and listed in numerical sequence of the transmittal number shown on ENG Form 4025. When the project is 90 percent complete, the updated register will be submitted to the COR for review to assure that required submittals and re-submittals are noted.

6.1.1 Scheduling

The approved Submittal Register will specify the scheduled dates for submittal. Submittals that cover an entire system or several interrelated components will be coordinated and submitted concurrently. Certifications to be submitted with the applicable drawings will also be scheduled.

6.1.2 Transmittal

Submittals to the USADEH will be transmitted on ENG Form 4025. Each item to be submitted will be identified to ensure proper listing of the specification paragraph and sheet number of the contract/design drawings pertinent to the data submitted for each item. ENG Form 4025 will be attached to each copy of a submittal.

6.1.3 Deviations

For submittals that include proposed deviations requested by ECC, the "Variation" column on ENG Form 4025 will be marked. ECC will establish in writing the rationale for the deviation and annotate deviations of the submittal.

6.1.4 Certification

The QCSM is responsible for certifying that all submittals are in compliance with contract requirements and for assuring that all certifications provided by others (i.e., vendors and suppliers) are accurate and in compliance with contract requirements.

6.1.5 Submittal Categories

Both Government Approval (GA) and For Information Only (FIO) classified submittals will be sent directly to:

Helene Takemoto, Resident Engineer
US Army Corps of Engineers
Honolulu Engineer District
Building 230
Fort Shafter, Hawaii 96858-5440

6.1.6 Certificates of Compliance

Quality compliance certificates required for the project (i.e., seed, fertilizer, etc.), include the following:

- Name and address of the Contractor;
- Project name and location;
- Quantity and date of the shipment or delivery of the certified material; and
- Signature of an official authorized to certify the quality of the material for the manufacturer.

Copies of laboratory test results submitted with the certificates will contain name and address of the testing laboratory and date of the reported tests. Certification will not relieve the ECC from supplying satisfactory material.

7.0 TESTING

Testing and test control practices support project work activities. Testing is conducted for two purposes:

- Verify conformance to quality requirements (i.e., proof tests prior to installation, pre-operational tests and construction tests, product certification tests); and
- Provide data for use in other activities (i.e., field and/or laboratory tests conducted to provide design input data).

7. 1 Operational Testing

Operational testing will be conducted to verify that the materials and techniques used in the performance of this SOW are in compliance with project specifications and in conformance with established parameters. Results will be documented and provided to the USACE as specified. As discussed in the Treatment Plan, system testing to be performed during the project consists of the following:

- Treated soil will be tested to certify clean up levels are attained whenever contaminated material is being processed through the system;
- Regulatory emissions testing will be required during the demonstration test, interim operations, full scale operations, and decontamination phases of the project;
- Initial performance testing will be required during the demonstration test; and
- Operational testing for system maintenance will be conducted during the demonstration test, interim operations, full scale operations, and decontamination phases of the project.

7. 2 Acceptance Testing

Acceptance testing will be conducted to identify specific conditions that must be achieved for the work or material to be within acceptable quality parameters. Testing methods and procedures will be performed by accredited laboratories and the information will be forwarded to the USADEH as required.

7. 3 Geotechnical and Materials Testing

ECC will utilize the American Society of Testing and Materials (ASTM) geotechnical and materials testing methods for the quality verification necessary for acceptance during backfill, compaction, and grading activities. ECC will use a local engineering provider of this service. Any off-site source material used to backfill the excavations will be tested to ensure the material is free from radiological and chemical contamination. The details of the analytical testing are presented in the SAP. Radiological testing of the backfill will consist of a gamma radiation survey of the material at the source location. Gamma radiation measurements will be read continuously at an elevation of approximately two inches above the ground level with a gamma scintillation detector (Mirco-R-Meter, Ludlum 19) calibrated to a pressurized ionization chamber.

Material testing of the backfill material will be performed in accordance with the following ASTM methods:

ASTM D 421	Soil Samples Particle-Size Analysis and Determination of Soil Constants
ASTM D 422	Particle-Size Analysis of Soils
ASTM D 1140	Material in Soils Finer Than the No. 200 Sieve
ASTM D 1556	Density of Soil in Place by the Sand-Cone Method
ASTM D 1557	Moisture-Density Relations of Soils and Soil Aggregate Mixtures Using 10-lb Rammer and 18-inch Drop
ASTM D 2166	Confined Comprehensive Strength of Cohesive Soil
ASTM D 2167	Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D 2216	Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures
ASTM D 2487	Classification of Soils for Engineering Purposes
ASTM D 2922	Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 2937	Density of Soil in Place by the Drive-Cylinder Method
ASTM D 3017	Moisture Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 3080	Direct Shear Test of Oil under Consolidated Drained Conditions
ASTM D 4318	Liquid Limit, Plastic Limit, and Plasticity Index of Soils

8.0 NOTIFICATION OF NONCOMPLIANCE

This section describes the procedures for controlling noncompliant items.

8. 1 Identifying Deficiencies

The QCSM will be notified of all deficiencies identified during the course of site activities to ensure that they are documented, reported, and tracked, corrective actions are taken, and follow-up verification is conducted.

The QCSM will include the identified deficiencies in the Daily Quality Control Report, noting the item found to be deficient, date, time, location, applicable drawing number, specification number, the person who identified the deficiency, and the status of the item to which the deficiency applies (installed, awaiting installation, deficiency identified upon receipt, item previously accepted but in storage, etc.). The QCSM will complete a Nonconformance Report (NCR), and enter the NCR in the database tracking system. The database tracking system serves as the daily tickler file of identified deficiencies so the QCSM can monitor their status. The NCR form provides the hard documentation of the status of the deficiency and includes the documented history of the deficiency as corrective action proceeds.

The QCSM will update the status of the deficiency in the database tracking system on a daily basis or when there is a change in status. Before the work activities of the day begin, the QCSM will access the database tracking system and note the deficiencies that require follow-up verification that day. New or changed status will be entered into the database at the end of each day. The Daily Quality Control Report will include a report on each NCR/deficiency that was completed and closed out for that day.

8. 2 Completion Inspection Punch List

Completion inspections conducted by the QCSM typically result in the development of a punch list of items that do not conform to approved design, plans, and specifications. During the course of each completion inspection, the QCSM will document items of noncompliance in a punch list that will serve as input to the QCSM database for items requiring corrective action. The database will serve as the tracking system for the follow-up of open items and identify when they are completed and closed out. The QCSM will monitor the punch list corrective action database on a daily basis until all corrective actions are complete and the punch list is closed out.

8. 3 Notification

The CO will be informed of the identification and progress toward resolution of nonconforming items/conditions. This is accomplished through the reporting requirements stated in implementing procedures and/or plans or through attendance at coordination meetings.

9.0 FIELD QUALITY CONTROL

The field control component of the CQCP includes:

- Procedures for documenting and justifying any field actions contrary to the CQCP;
- Documentation of all pre-field activities such as equipment check-out, calibrations, and manufacturer inspections;
- Documentation of field measurement QC data;
- Documentation of field inspection activities during the project; and
- Documentation of post-field activities including sample shipment, receipt and laboratory analysis.

9. 1 Field Changes to CQCP

Changes to this CQCP, procedures, testing requirements or personnel may be required to adjust for unforeseen circumstances. Changes may be required by the USADEH in the event that the identified procedures do not provide adequate control, or may be pro-actively initiated by ECC to ensure that QC objectives are met.

Should modifications to this CQCP become necessary or desirable, the QCSM will notify the COR in writing in the form of a Request for Information (RFI). The notification will include a description of the proposed change, the reason(s) for requesting the change, and the date upon which the change needs to become effective, along with other pertinent information. Proposed or requested changes will not be considered in effect until written approval is granted by the USACE. ECC will make every effort to provide as much lead time to the USADEH as possible.

9. 2 Pre-Field Activities

Pre-field activities include equipment calibrations, preparation inspections, and a copy of the manufacturer inspections for materials to be incorporated into the project.

9.2.1 Equipment Calibrations

Equipment will be inspected and calibrated according to manufacturer's requirements prior to field use. Inspection of heavy construction equipment will be recorded daily on the Equipment/Vehicle Inspection Form. Calibration of field testing equipment will be recorded on the Testing Equipment Calibration Form. All equipment inspections and calibrations will be conducted by persons with specific training and experience in the operation of that equipment. These forms will be turned in to the QCSM daily and attached to the Daily Quality Control Report. Examples of these forms are attached in Appendix F, QC Forms.

9. 3 Field Measurement Quality Control

Field measurements will generate substantial quantities of data. Field measurement data for the Phase IV will include field testing of soils. For all tests, results will be included on the Daily Quality Control Report as soon as the results become available to the QCSM. All field tests will be tracked and recorded in accordance with the SAP.

10.0 DOCUMENTATION AND CERTIFICATIONS

10. 1 QC Report

QC reports include the following.

- Daily Quality Control Report:
    - Description of work
    - Weather
    - Rainfall
    - Temperature
    - Work performed by ECC
    - Work performed by subcontractors
    - Specific inspections performed
    - Type and location of tests performed and results of the tests
    - Verbal instructions received from the CO
    - Submittal action
    - Delivery of equipment and materials
    - Offsite surveillance of fabricated items
    - Remarks
- Preparatory, Initial, and Final Inspection Reports;
- Equipment Daily Checklists;
- Nonconformance Report; and
- Record of SOW Clarifications.

Forms for these QC reports are presented in Appendix F.

10. 2 Files

ECC maintains three distinct forms of files for project documentation:

- Hard copy
- Management Information System (MIS) software
- MIS backup discs

ECC will provide other data documentation as required.

10. 3 Certifications

As per Contract Specifications in Specification Section 01440, *Contractor Quality Control*, the following statement will be included in each Daily Quality Control Report:

> *"On behalf of the Contractor, I certify that this report is complete and correct and equipment and material used and work performed during this reporting period is in compliance with the contract drawings and specifications to the best of my knowledge, except as noted in this report."*

10.3.1 Completion Certification

The QCSM will present a certificate of completion stating that the "work has been completed, inspected, tested and is in compliance with the contract". A certificate will be given to the CO upon completion of the project to attest the accuracy of the as-built drawings.

FIGURES

APPENDIX A
PROJECT ORGANIZATION CHART

APPENDIX B
LETTER OF AUTHORITY TO QCSM

APPENDIX C
SUBMITTAL REGISTER

APPENDIX D
QC FORMS

Contractor Quality Control Report Continuation Sheet

(Attach additional sheets if necessary)

Page ____ of ____

Date: ______________

Contractor: Environmental Chemical Corporation (ECC) Report No. ________

CONTRACT NO. ______________________CTO NO. __________ PROJECT NO. _______

FOLLOW-UP PHASE INSPECTION

Y - Yes; N - No; N/A - Not Applicable	
Work is in compliance with the contract	

Identify Definable Feature of Work, Location, and Personnel Present

Testing Performed & who Performed Test (including number of samples and tests taken)

______________________________ __________

Contractor's QC Manager Date

Contractor Quality Control Report Continuation Sheet
(Attach additional sheets if necessary)

Page ____ of ____

Date: _____________

Contractor: Environmental Chemical Company (ECC) Report No. ________

Contract No. _________________________*CTO No.* ________ *Project No.* ________

PREPARATORY PHASE INSPECTION

Y - Yes; N - No; N/A - Not Applicable	
Plans and Specs have been reviewed	
Submittals have been approved	
Materials comply with approved submittals	
Preliminary work was done correctly	
Testing Plan has been reviewed	
Work method and schedule discussed	

Identify Definable Feature of Work and Location, and List Personnel Present

____
____
____
____
____
____
____
______

_________________________ ______________
Contractor's QC Manager Date

Contractor Quality Control Report Continuation Sheet

(Attach additional sheets if necessary)

Page ____ of ____

Date: _____________

Contractor: Environmental Chemical Corporation (ECC) Report No. ________

Contract No. __________________________ CTO No. _________Project No. _____________

INITIAL PHASE INSPECTION

Y - Yes; N - No; N/A - Not Applicable	
Preliminary work was done correctly	
Sample was prepared and approved	
Workmanship is satisfactory	
Test results are acceptable	
Work is in compliance with the contract	

Identify Definable Feature of Work, Location, and Personnel Present

Testing Performed & Who Performed Test (including number of samples and tests taken)

_________________________ _____________

Contractor's QC Manager Date

STOP WORK ORDER

Project Name: ____Date: _________
S.W.O. No___Page 1 of _____
Contract No. ______________________________ CTO Number - ________

1. Written Notice Issued to:_____________	2. P.O. # or Activity:__________________________
Name: _______________________	3. Location:_________________________________
Title: _______________________	4. Issued by (name): ___________________________
Org.: _______________________	Issued by (title):________________________________

5. Verbal Notice Issued to:
Name:_______________________ Date: __________________ Time: __________

Title:_______________________

6. Associated NCR No.: ________________
7. Associated CAR No.: ______

8. Stop Work Order Condition Description:

9. Remedial Action Required:
By Whom:_______________________ By When: _______________

Required Remedial Action Determined by:
Project Manager:___________________________________ Date: __________

CQC MANAGER: **DATE:**

10. Follow-up of Remedial Action Taken:
Verbal Notice to Resume Operations Given to:
Name: _______________________ Date: _________________Time: __________

Title: _______________________

Stop Work Order Cancellation Authorized by:

Program CQC Manager: __________________________________Date: ___________

CORRECTIVE ACTION REQUEST

Project ____

Contract No. _______________________________________ CTO _____________

<table>
<tr><td colspan="4">Adverse Trend:
Yes ___
No ___</td><td colspan="4">CAR Number:</td><td colspan="4">Date:</td></tr>
<tr><td colspan="6">Organization/Project/Department:</td><td colspan="6">Person Contacted:</td></tr>
<tr><td colspan="12">Discrepancy (include specific requirements violated):</td></tr>
<tr><td colspan="6">Originator:</td><td colspan="6">Response Due Date:</td></tr>
<tr><td colspan="12">Corrective Action Taken/Proposed to Correct Discrepancy:</td></tr>
<tr><td colspan="12">Corrective Action Taken to Prevent Recurrence (the cause of the discrepancy must also be included here):</td></tr>
<tr><td colspan="6">Corrective Action Taken by (signature and date):</td><td colspan="6">Date When Corrective Action Completed:</td></tr>
<tr><td colspan="6">Corrective Action Evaluated:</td><td colspan="6">Verification of Implementation:</td></tr>
<tr><td colspan="3">Evaluated by:</td><td colspan="3">Date:</td><td colspan="3">Verified by:</td><td colspan="3">Date:</td></tr>
</table>

STOP WORK ORDER LOG

Project:________________________________Contract/CTO____________________

SWO No.	Action Party/Organization	Subject	Date Issued	Date Closed

NON-CONFORMANCE REPORT

Contract No. _________________________ CTO No. ________

NCR Number:	*Project Name and Number:*	*Date:*	Page 1 of

Nonconformance Description (include specific requirement violated):

Identified by: ______________________________ Date: _________________

Root Cause of Nonconforming Action:

Corrective Action(s) to be Taken (include date when action(s) will be complete):

To be Performed by: _______________________ Date: ______________

Action(s) to be Taken to Preclude Recurrence:

To be Performed by: ___________________________ Date: _____________________

Acceptance by:

Project Manager: _________________________ Date: __________

CQC Manager: _________________________ Date: __________

Corrective Action(s) Completed by and Date:	*Verification Completed by and Date:*

FIELD WORK VARIANCE

Project Name:____ Variance No.:____________

Project No.: _________________________________ Page 1 of ____

Contract No. _________________________________ CTO No. __________ Date: ______________

Variance (include justification and present requirements) Requested by: _____________________

Proposed Change

Technical Justification

Cost/Schedule Impact

Reason for Change ___ Addition ___ Deletion

Change Order Required ___ No ___ Yes Change Order No.

Applicable Document

cc:

Approved by: _____________________ Date:
Project Manager

Approved by: _____________________ Date:
CQC Manager

Approved by: _____________________ Date:
Contracting Officer

Control Phase ______________ **Environmental Chemical Corporation**

DAILY QUALITY CONTROL REPORT

AND CONTRACTOR PRODUCTION REPORT

Daily Report No. ________________ Date ________________

Contract No. ___________________________ CTO No.__________

Project Title and Location:

Weather a.m.: ______ Rainfall in. ______ Temp. ________ Min.______ Max.________

Weather p.m.: ______ Rainfall in. ______ Temp. ________ Min.______ Max.________

1. Personnel On-Site

NAME	LOC	ECC	SUB	EMPLOYEE	TYPE OF WORK	HRS

Date: ___________

2. Job Safety Actions/Safety Inspections Conducted

____

____

____

Was the Job Safety Meeting Held? Yes________ No________(Attach. Minutes)
Were there lost time accidents? Yes________ No________ (Attach. OSHA Report)
Trenching/scaffold/high voltage Yes________ No________ (Attach. Statement)
Haz. Mat. released into environment? Yes _______No ________ (Desc. of Incident)

3. UXO Actions Taken

____

____

____

4. List of Construction Equipment on Work Site and Hours Used

____

____

____

5. Instructions Received from the Contracting Officer on Deficiencies or Work Required

____

____

____

6. Quality Control Inspections Conducted

____

____

____

7. Submittal Action

____

____

____

8. Remarks

____

____

____

(Work Progress and Delays)
(Safety Hazards Encountered)
(Instructions Given and Corrective Actions Taken)

Date: _______________

9. Record of Visitors to the Work Site

____
____
____

10. Definable Feature of Work

____
____
____

11. Remarks: Rework:

____
____
____
____
____

12. Attachments:

____
____
____
____
____

13. Certifications: I certify that the above report is complete and correct and that I, or my authorized representative, have inspected the work performed this day by the Prime Contractor and each subcontractor, and have determined that all materials, equipment, and workmanship are in strict compliance with the plans and specifications except as may be noted above.

______________________________________ ____________________

Project Quality Control Specialist *Date*

REWORK ITEMS LIST

Project: CTO NO.

Contract No.

Item	Date Identified	Date Corrected
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		
17.		
18.		
20.		
21.		
22.		
23.		
24.		

EQUIPMENT DAILY CHECK LIST

Equipment Name/Number: ____
Engine Hrs./Mileage: ____________________________
Date: ____

BRAKES	COOLING WATER
AIR SYSTEM	OPERATING CONTROLS
TIRES/TRACKS	LIGHTS/REFLECTORS
HORN	WINDSHIELD WIPERS
SAFETY DEVICES	FIRE EXTINGUISHER
GLASS	BACKUP ALARM
MIRRORS	ENGINE OIL Add/check
DEFROSTER	EXHAUST SYSTEM
STEERING SYSTEM	FLUID LEVELS
WIRE ROPE	ELECTRICAL SYSTEM
APPEARANCE	BREATHING AIR BOTTLES

These items are to be checked each shift before operating this piece of equipment.
Report ALL items requiring repair to supervisor prior to operation of equipment.

NOTES:____
OPERATOR: ____ (Print Name)

CORRECTIVE ACTION REQUEST LOG

Project ____

Contract No. ________________________________ **CTO** _________________

CAR No.	Orig. Date	Initiated By	Description	Responsible	C/A	Status	
Project No.	Close Date	Closed By		Party	Due	C/A Recommended & Approved	Re-inspection Results

CONDITIONAL RELEASE TRACKING LOG

CONTRACT __________________________TASK ORDER NO.:__________

Project Name: ____ Project No.: ____________________

Item No.	Item Description	Release Restriction	Date Identified	Date Required	Date Received/ Closed	Remarks

NON-CONFORMANCE REPORT TRACKING LOG

CONTRACT NO. ___________________________________ PAGE _______OF_______

CTO NO. ____________

NCR NO.	ORIG. DATE	INITIATED BY	NONCONFORMANCE DESCRIPTION			STATUS	
PROJECT NO.	CLOSE DATE	CLOSED BY		RESP. PARTY	C/A DUE	C/A RECOMMENDED AND APPROVED	REINSPECTION RESULTS

PERSONNEL QUALIFICATION VERIFICATION FORM

CANDIDATE:		**POSITION:**	
CONTRACT:			
REVIEW ITEMS		CANDIDATE QUALIFICATIONS	VERIFIEDBY/DATE
EXPERIENCE:	REQUIRED: AREA AND YEARS		
	ACTUAL: AREA AND YEARS		
EDUCATION:	REQUIRED:		
	ACTUAL:		
CERTIFICATIONS REGISTRATION:	REQUIRED:		
	ACTUAL:		
TRAINING:	REQUIRED:		
	ACTUAL:		

Other	Required		
	Actual		

TEST EQUIPMENT LIST AND CALIBRATION LOG

Contract No.___________________________ CTO No. _____________

PROJECT NAME: _______________________

EQUIPMENT NAME: _______________________________ EQUIPMENT TOLERANCE: ______________

Equipment Number and Use (Screening or Analytical)	Equipment Name (Manufacturer and Model ID)	Date and Time (of Calibration)	Calibration Standard Used (Manufacturer and Lot Number)	Equipment Reading (Include Units and Tolerances)	Comments (and/or Observations)	Initials (of Person)

TESTING PLAN AND LOG

CONTRACT NO.	PROJECT TITLE AND LOCATION:	CONTRACTOR: ECC

SPECIFICATION SECTION AND PARAGRAPH NUMBER	ITEM OF WORK	TEST REQUIRED	ACCREDITED/ APPROVED LAB YES	NO	SAMPLED BY	TESTED BY	LOCATION OF TEST ON SITE	OFF SITE	FREQUENCY	DATE COMPLETE	DATE FORWARDED TO CONTR. OFF	REMARKS

INTERIM DRAFT EXCAVATION AND SOIL STAGING PLAN

Phase IV
Tanapag Village, Island of Saipan
Commonwealth of the Northern Mariana Islands

Prepared for

Environmental / DoD Support Branch
United States Army Corps of Engineers
Honolulu Engineer District
Building 230
Fort Shafter, Hawaii 96858-5440

Contract No. DACW62-00-D-0001
Delivery Order No. 002

May 2001

Environmental Chemical Corporation
99-1151 Iwaena St.
Aiea, HI 96701

INTERIM DRAFT EXCAVATION AND SOIL STAGING PLAN

Phase IV
Tanapag Village, Island of Saipan
Commonwealth of the Northern Mariana Islands

May 2001

I hereby certify that the enclosed Excavation and Soil Staging Plan shown and marked in this submittal, is proposed to be incorporated with Contract Number DACW62-00-D-0001, Delivery Order 002 Tanapag Village, Phase IV. This Plan is in compliance with contract specifications and OSHA requirements, and is submitted for Government approval.

Reviewed by:

____

Project Manager Date

____

Project Engineer

Date

____

Quality Control Systems Manager Date

Accepted as a submittal:

____

USACE Contracting Officer Date

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ACRONYMS

250	CAT 250E Articulating Dump Truck
544	John Deere 544 Loader
583	CAT 583 Single Drum Sheepsfoot Compactor
690	John Deere 690 Hydraulic Excavator
bgs	below ground surface
CFR	Code of Federal Regulations
CO	Contracting Officer
D-3	CAT D-3 Dozer
ECC	Environmental Chemical Corporation
EPA	Environmental Protection Agency
GPS	Global Positioning System
ITD	Indirect Thermal Desorption
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
QCSM	Quality Control System Manager
RCRA	Resource Conservation and Recovery Act
SSHP	Site Safety and Health Plan
TSCA	Toxic Substances Control Act
USADEH	United States Army Engineer District, Honolulu

1.0 INTRODUCTION

This document presents the technical approach proposed by Environmental Chemical Corporation (ECC) for the Phase III Removal Action at Tanapag Village, on the Island of Saipan, Commonwealth of the Northern Mariana Islands, under Contract Number DACW62-00-D-0001, Delivery Order 0002. The treatment and disposal tasks of the Phase III Removal Action are designated as Phase IV work. This document is provided to support planning of the Phase IV work.

The purpose of the Excavation and Soil Staging Plan is to describe the excavation and soil staging approach and procedures to be used for the proposed on-site treatment at Site C2 at Tanapag Village. The Excavation and soil Staging Plan describes the following project activities:

- Progress Survey, and Post-Excavation Survey;
- Sequence of Soil Stockpile Processing;
- ITD Soil Treatment Rate;
- Overview of Excavation Operations;
- Sequence of Excavation;
- Excavation Controls; and
- Backfill and Compaction.

2.0 SURVEY WORK

Buccatt Professional Land Surveying Corporation, a qualified survey company registered with the Island of Saipan, will continue providing project survey work for the Removal Action at Tanapag. Buccatt has already surveyed and calculated the stockpile volumes at Site C2 and established survey controls for the projects during Phase III of work. Buccat will perform quantity measurements during and a Post-Excavation Survey at the conclusion of the treatment phase of work. Survey work will be monitored and reviewed by the Quality Control System Manager (QCSM). Buccatt personnel will work under the Site Safety and Health Plan (SSHP).

To perform this work Buccatt will employ a two-man survey crew utilizing the Global Positioning System (GPS) and calibrated transit units. All survey work will be referenced back to and established from control points.

Buccatt will provide a topographic map with two-inch contour intervals and one set of computer diskettes formatted in AutoCad Version 13.

2.1 Pre-Excavation Survey

The Pre-Excavation Survey will be performed to establish control points as shown on the contract drawings. The survey crew will establish the contours of the ground and well as the locations of structures within the project limits. The survey will include topography of the site, the Indirect Thermal Desorption (ITD) layout and treatment area, in-process stockpiles, in-situ PCB-contaminated soil areas, processing area, support zone(s), and other relevant references or features for documentation and control.

As required, Buccatt will stake the areas that will be excavated within Site C2, where PCB-contaminated soils have been left in-situ below various soil holding cells and in the central soil staging area referred to as Area 3. The stakes will be offset up to 10 feet from the boundaries of the excavation. The staking provided by Buccatt will include information such as the offset to the excavation, the depth of excavation, and other possibly pertinent information. The surveyors also will stake and mark any existing underground utilities present on the site.

2.1.1 Benchmarks and Control Points

Two permanent elevation benchmarks and two horizontal control points will be located in positions unlikely to be disturbed by vehicular traffic or construction operations. The benchmarks will consist of a 2-inch diameter convex brass plate embedded in eight (8) inch diameter by 36-inch long concrete pipe. The elevation will be stamped on the brass plate. The top of the concrete will be rounded upwards from the surrounding soil towards the plate and troweled smooth to shed water.

The survey control points will consist of 5/8 inch diameter rebar at a minimum length of 30 inches long, encased in 8-inch diameter by 36 inch long concrete pipe. The rebar will project about one inch above finished top of concrete. The top of the concrete will be rounded upwards from the surrounding soil toward the rebar, and troweled smooth to shed water.

The X, Y, and Z coordinates of the benchmarks and survey control points will be determined and recorded with a maximum permissible error of 0.10 feet in any coordinate direction.

As previously mentioned, all work will be referenced back to the established control points. The control points will be re-established when necessary and maintained throughout the life of the contract. Any errors or apparent discrepancies found on the Contract Drawings or in the Specifications will be reported to the Contracting Officers (CO) or the Contracting Officer's Representative (COR) for interpretation prior to proceeding with work. Upon request, documentation verifying the accuracy of the survey work will be provided to the CO.

2.2 Progress Survey

Periodically throughout the project, Progress Surveys to measure the cubic yards of soil removed from an excavation for payment will be performed. Surveys of each excavation will be performed prior to backfilling and at the completion of the backfilling operations. At a minimum, the Progress Surveys will be performed monthly; surveys of each excavation will be performed on an as-needed basis.

Certification signed by the Surveyor will be provided to the CO stating that elevations and locations of site construction features are in conformance, or nonconformance, with Contract Documents at the completion of each phase of work.

2.3 Post-Excavation Survey

At the completion of site work and after ECC has completely demobilized from the site, a final Post-Excavation Survey will be performed. The Post-Excavation Survey will consist of the final topography, treated soil piles, all drainage features, remaining vegetation, gates, fences, tree lines, and any areas of adjacent properties that were disturbed by remediation operations.

3.0 SOIL STOCKPILE REMOVAL SEQUENCE

Contaminated-soil will be removed from the soil-holding cells on an 8-hour-day, 7 day-per-week schedule. The rate of removal from the soil-holding cells will be higher than the rate of soil treatment through the thermal treatment unit, so that the schedule of soil removal will accommodate the 24-hour-per-day, 7-day-per-week schedule of thermal treatment.

The soil holding cells will be removed in the following sequence: 5, 4, 12, 3, 2, 6, 11, 10, 9, 8, 7, and then 1 (the Structure). Removal, screening, and stockpiling of contaminated soil in Cell # 5 will commence prior to startup of the thermal treatment unit. This will facilitate freeing up an area to stockpile treated soils after confirmatory sampling. Cell # 7 has most of the stockpiled green waste and a significant portion of the concrete rubble and thus will be handled last when more area will be available for mulching and processing these materials.

The screening plant and the crushing plant will be set up in the Processing Area, located within Area 3 at Site C2. Area 3 is the central core area of Site C2 that directly accesses the holding cells, the CRZ, the support zones and the proposed ITD plant and treatment areas. Area 3 contains in-situ PCB-contaminated soils and the planned soil staging and handling tasks will be performed within the Exclusion Zone. Berms of clean coral fill will be maintained and reconfigured as required to contain and separate contaminated work areas from clean areas during all Phase IV processing and treatment activities.

Soil removal will begin from Cell # 5. The cover liner will be pulled back enough to allow an amount of soil to be treated that day. A front-end loader will remove soils from the cell to within one foot of the bottom liner and transport the materials to the Processing Area for screening and crushing. At the Processing Area, the soils will be passed through a vibrating two-inch minus screen. The minus two-inch fraction will be moved by loader to the Structure (Cell # 1) and stockpiled there for treatment by the ITD. Metal debris will be segregated from the two-inch oversize before the crushing step. The two-inch plus material will be sent through the crushing plant, screened again for two-inch oversize, and added to the to-be-treated pile in the Structure.

The remaining one-foot soil layer left in Cell # 5 will b scraped by excavator into a stockpile near the entry of the cell towards Area 3. The soil pile will then be moved to the Processing Area for screening and routed to the appropriate staging piles. Hand labor will be required to remove the last few inches of material from the cell. Once all the soil has been removed, the liner will be cut into manageable pieces and decontaminated in the CRZ. Metal debris will be decontaminated and sent to a local recycling center located at Lower Base Road.

The remaining cells will be emptied of contaminated materials following the same approach as for Cell # 5. When all the soil stockpiles and liners have been removed, and the underlying contaminated soils have been sampled, excavated and treated, Area 3 will be the last area left to be excavated and sampled for verification. At that time, the screening and crushing plants will be moved to an adjacent clean area and set on a double layer of 30-mil PVC liner, and the contaminated soils in Area 3 will be excavated and treated.

4.0 ITD SOIL TREATMENT RATE

The soil treatment rate for the ITD unit is estimated at an average of 10 tons per hour. This will require 480 tons or 320 bank cubic yards of excavated soil to be excavated prior to each
**weekend to keep the ITD unit operational through the 48 hour weekend period.

The excavation rate will average approximately 225 bank cubic yards per day to maintain adequate production for the ITD unit. Treated soil stockpile will be limited to available clean flat areas in the treatment area. At project start, very little land will be available. A clean area adjacent to the site will be established to store treated clean soil.

5.0 OVERVIEW OF EXCAVATION OPERATIONS

The sampling and excavation of in-situ contaminated soils located below a holding cell will be initiated as soon as the cell is empty and the liner is removed. This approach will minimize the duration of the treatment phase and allow the in-situ contaminated soils to be excavated and the verification sampling to be completed as soon as possible. The objective will be to have the last cell area and Area 3 verified clean during the last two weeks of ITD plant operation.

5.1 Hours of Operations

Hours of operation for the excavation portion of the project will be from 8:00 AM to 5:00 PM. Under no circumstances will operations, other than the ITD unit, start before 7:00 AM.

5.2 Heavy Equipment Requirements

ECC's primary tool for this excavation will be a John Deere hydraulic excavator. The excavator will be equipped with a smooth edge bucket to minimize cross-contamination on the site. The primary earthmover to transport material from the excavation area to the feed preparation area will be a front-end loader. Although specific excavation equipment was selected, ECC may elect to change the type and/or size of any and all pieces throughout the duration of the excavation operations. A 2,000-gallon water truck or a spray-hose system and other miscellaneous tools and equipment will support excavation operations.

To avoid cross-contamination, the excavator will perform excavation operations outside the limits of the excavation. In some excavation areas this may not be practical; however, it will be the general rule for excavation operations.

The excavator will not heap its bucket to full capacity and will take care to avoid spilling material outside the contaminated excavation footprint. The front-end loader will not be overloaded or heaped, thus reducing the possibility of material spills in transit to the stockpile area.

The excavation crew will consist of operators for the excavator and the front-end loader, and one laborer assisting as a grade checker for the excavation work. The grade checker, sampling technicians, and survey crew will be the only personnel allowed to enter the excavations greater than four feet deep.

During excavation operations a water system will be on-site to control any dust conditions that may occur. This system will be equipped with side and re-bar sprayers as well as a hand held two-inch hose. Water will be applied to the excavation when required or requested as well as to the haul road, if necessary. The water truck also will apply water to trucks that are loaded heading for the stockpile area, if conditions warrant.

The equipment used for backfilling operations are the Cat D-3 (D-3) dozer, John Deere 544 (544) loader, and Cat 583 (583) compactor.

5.3 Excavation Methodology

Excavations are restricted to the holding cell outlines and Area 3 as shown on Figure 1. All excavated material will be stockpiled in accordance with the contract specifications and either treated in the ITD unit or disposed off-site.

5.3.1 Utilities

Subsurface utilities encountered during excavation operations will be excavated to the limits of the excavation. If the utilities encountered are to be abandoned, they will be disconnected, terminated, and capped in accordance with local utility company requirements.

5.3.2 Confirmatory Sampling

When an excavation is completed, verification sampling will be performed in accordance with sampling requirements and methodology and quality control requirements defined in the Sampling and Analysis Plan (SAP) and the approved Phase III Removal Action Work Plan.

If the additional verification sampling demonstrates that the PCB contamination is at or above one ppm, soil will be excavated in additional one to two-foot increments. Sampling and excavation procedures will be repeated as often as necessary until the clean-up goal is met.

5.3.3 Site Environmental Protection

Precautions will be taken to minimize cross-contamination of water or soil and to protect the clean areas. Coral berms have been left at the site to confine the contaminated areas and holding cells. These berms will be reconfigured as the contaminated areas are cleaned.

**Windborne particulates resulting from remediation activities will be controlled using dust control measures, engineering controls, and stockpile management techniques.

6.0 EXCAVATION SEQUENCE

The sequence of excavation of in-situ contaminated soils at the site will generally follow the same sequence as for the removal of the stockpile cells: 5, 4, 12, 3, 2, 6, 11, 10, 9, 8, 7, and 1. This cell sequence may vary if a given cell requires multiple rounds of verifications sampling and excavation, or other factors such as stockpile materials variability, unexpected site conditions (contamination below ground water table). The last portion of the site to be excavated and sampled for verification will be Area 3.

7.0 MATERIAL HANDLING

There are three types of materials in the eleven holding cells (Cell # 1 is the Structure and is empty); type one is a combination of coral, sand and clay soils; type two is concrete debris and type three is green waste. Type one material is approximately 90% for the total volume, type two is 8% and type three is 2%. Type two materials are found in 30% of the cells and type three materials are predominately consolidated in cell #7.

Soil and concrete debris in the storage cells must be separated, screened and sized to two-inch minus prior to thermal treatment. Green waste will be separated and processed through a tub grinder resulting in a mulch type product. The following steps will be taken to prepare contaminated materials for thermal treatment.

As contaminated materials are removed from each soil-holding cell, the PVC cover liner will be progressively drawn back. A "hot-zone" transport route will be designated from each soil-holding cell to the soil Processing Area in Area 3. Area 3 is bordered by soil-holding cells 1, 6, 10 and the concrete pad designated for the location of the thermal treatment unit. This area is contaminated with PCB's in excess of 1ppm. This area will be used for contaminated soil handling and subsequently excavated and thermally treated after all stockpiled contaminated materials have been treated.

Once contaminated soil has been screened and crushed to 2-inch minus, processed materials will then be temporarily stockpiled in the Structure (Omni™ pre-fabricated, temporary tent), which is located over soil-holding cell 1.

The top portion of the contaminated-soil in each soil-holding cell to one foot above the bottom liner will be excavated with a rubber-tired front-end loader and placed in a 10 yd dump truck. The bottom foot of the stockpile will be removed with an excavator staged on top of the contaminated-soil within the subject cell. The excavator will remove the remaining soil and bottom liner by scraping the material into a pile then loading the material out into a 10-yd dump truck. The dump truck will transport the contaminated-soil to the Processing Area. A second rubber-tired front-end-loader will be utilized in the Processing Area to run the contaminated-soil through a vibratory screen equipped with a two-inch minus pass through. Material passing through the screen will be immediately transferred to the site Omni structure, located over soil holding Cell #1. The oversize material consisting of coral rock and concrete debris will be separated from scrap metal and run through a rock crusher located in the soil processing area. The crusher will size the material to two-inch minus. After crushing, this material will be screened again and transported to the Omni structure for storage.

Contaminated-soil will be transported from the Omni structure to the treatment unit as required with a rubber-tired front-end-loader. Equipment will be dedicated as much as feasible to work either in contaminated or clean areas in order to avoid cross-contamination. In cases where equipment is moved out of the contaminated areas, required decontamination procedures will be implemented in the contamination reduction zone (CRZ).

A clean rubber-tired loader will be utilized outside the soil processing area to transport the treated soil from the treated soil stockpile to area designated in Cemetery 2 for clean soil placement.

7.1 Material Storage

All excavated and screened soils and debris awaiting treatment in the ITD will be stockpiled in the OMNI structure for protection of rain infiltration and material run off. Material will be withdrawn from the structure on an as needed basis to enter the ITD. The ITD feed system is covered to prevent rainwater entering the system.

Weight of material entering the ITD is measured on a belt scale.

7.2 Scrap Metal and Wood

During excavation operations, scrap metal and wood may be encountered. Green waste will be managed in accordance with 7.0 using a tub grinder. The wood and metal material will be screened from material entering the ITD unit for treatment using two methods. First, scrap metal and wood will be removed from the soil at the excavation site. The excavator will remove any grossly oversized material from the excavation by simply sifting through the soil and placing any large pieces of the debris aside for separate handling. Also, some hand sorting will occur at the excavation, although minimal.

Secondly, the vibrating screen will be used to screen any material greater than two inches in size and allow smaller material to pass through to be treated by the ITD unit. At this stage, metal and wood debris will be removed from the oversize fraction. The grossly oversized material will be either reduced in size by the excavator or manually cut by either hot or cold cutting methods.

7.3 Rocks and Concrete

Rocks (coral) and concrete debris will be encountered in the stockpiled materials in the holding cells. Rock and concrete material will also be removed from the excavations. The rocks and concrete will be screened from the soil. Oversize material will be handled separately by the excavator and stockpiled within the footprint of the current excavation until the end of the day. At the conclusion of the workday, the rocks will be transported to the stockpile storage area and segregated from material screened for treatment.

A portable jaw crusher will be mobilized to the site. The jaw crusher may either be an attachment to an excavator or a stand-alone system. The crusher will crush the oversize rock and concrete to less than 1.5 inches in size (two-inch nominal). Subsequently, the fine material will be sent through the ITD unit for treatment.

In summary, ECC plans to reduce the size of all rock material by crushing and screening methods and treat the rock material in the ITD unit. After this treatment, the material will be well blended with the treated soil and returned to the excavation as clean, treated fill material.

8.0 EXCAVATION CONTROL

8.1 Sloping and Shoring

The soil that will be encountered in the excavations is presumably Type C soils as defined by 29 Code of Federal Regulations (CFR) 1926.650 Subpart P- Excavations. Therefore, ECC will take adequate steps will be taken to protect project personnel by sloping and/or benching excavations greater than five feet deep. Shoring systems are not planned for these excavations; based on previous work at Site C2, excavations are not expected to be deeper than four feet.

Sloping is an excavation method used to protect employees from cave-ins. The excavation is performed by forming sides of the excavation that are inclined away from the excavation. The angle of incline required to prevent a cave-in varies with site-specific factors such as the soil type, environmental conditions of exposure, moisture content, and application of surcharge loads. Currently, planned slopes of the excavations will be 1.5 feet horizontal lay back for every 1.0 foot of vertical (1.5 feet H:1 foot V) cut for excavations over five feet.

Another method that may be implemented is benching the excavation. Benching protects personnel from cave-ins by excavating the side of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near vertical surfaces between them. These excavations also will be on a 1.5 feet H:1 foot V.

Excavations of greater than four feet will have a ladder available for personnel to use for accessing and egressing the excavations. The ladder location will require no greater than 25 feet of lateral travel for personnel entering the excavation. A competent person will inspect the sloping and excavation floor prior to entering the excavation by personnel.

ECC will not work in excavations deeper than several feet below the water table. A sump and pump system may be utilized to remove water, if required. Any water removed will be stored as potentially PCB-contaminated and will be tested and verified clean before disposal. However, de-watering is not planned for Phase IV work.

8.2 Grade Control

To minimize the volume of material being excavated and avoid wasteful over excavation (beyond the existing liner), a responsible person will be on-site during the excavation activities to control lines, grade, and contours of the excavation. The control of the grade will be performed utilizing the following steps:

Establishment of the excavation area will be performed by the land surveyors. The locations of shallow excavations will be staked at the corners of the excavation, offset by 10 feet with a six-inch hub driven into the ground to the top of the existing grade. The excavation number, distance of offset, and design depth of the excavation from the hub will be noted on the grade stake. To alleviate confusion, the writing on the grade stake will face the direction of the excavation. For excavations that require sloping, the surveyors will place the stakes and hub with the same offset but from the hinge point or top of slope. In addition to the information previously denoted on the stake, the surveyors also will denote the excavation slope information such as a 1.5 feet H:1 foot V.

The surveyor will verify the depth of each excavation. After the surveyor is informed that the excavation has reached the designed grade, the surveyor will verify the excavation dimensions and provide the data for as-built drawings. If confirmatory sampling does not meet the remediation goals and additional excavation is required, these steps will be repeated.

8.3 Delineation of Sampling

Sampling requirements to be performed are discussed in the Sampling and Analysis Plan. Most of the sampling will follow the approved protocols contained in the Phase III Removal Action Work Plan.

9.0 BACKFILL AND COMPACTION

9.1 General Requirements

Backfilling will not begin until excavation or construction below finished grade is approved; underground utilities systems are inspected, tested and approved; any forms used removed; and the excavation is free of trash and debris. After remediation activities are completed at each excavation, as-built surveys are completed, and authorization has been received from the CO
**(Appendix A), backfilling operations will commence.

The source of backfill material will be the excavated material that was treated by the ITD unit. The excavated material will only be used as backfill material after the material is treated at the ITD unit and the results are verified by post treatment confirmatory sampling analysis.

Treated excavation material used for backfill will be stored at the treated material temporary stockpile areas in clean areas adjacent to the ITD unit or stockpiled separately if it cannot be readily placed as backfill. The material will be stored on top of a 10 mil thick sheet of plastic stretched across the material laydown area and separated by berms from contaminated areas at the site.

Fill material will not contain scrap metal, wood, concrete, asphalt, or other man-made materials larger than two-inch.

9.2 Backfill and Consolidation

The backfilling operations for a specific excavation area will lag behind the actual excavation and treatment tasks and may actually be performed at the end of the project field activities. This is dependent on the confirmation sampling turn-around time, verification results, and the time necessary to treat contaminated soil.

The operations will begin with the D-3 preparing the subgrade of the area to receive fill material. The D-3 will remove any undesirable features in the subgrade prior to the placement of fill material, including ruts, disturbed ground, wet spots and soft areas (if not in contact with the groundwater table), and organic or man-made materials. The D-3 will be equipped with rippers on the backside of the machine and will scarify the excavation to a depth of six inches. The area will either receive fill after the scarifying or be allowed to dry out or receive water for the proper moisture content to be achieved. If the area is in close proximity to the groundwater table this procedure may not be possible and other means will be discussed with the CO.

Since all excavations will be greater than 1 V foot : 4-H feet, the side slopes receiving backfill will be stepped or broken up. This will enable the fill material to adhere to the existing subgrade by using the front blade of the D-3 in a dozing action penetrating one foot into the slope for every six inch lift placed.

The fill material will be transported from the clean temporary stockpiles to the excavations by means of the 544 loader. The 544 loader will place the material in the excavation where the material will then be spread out by using the D-3. The backfill material will be spread and consolidated in lifts not exceeding nine inches. The consolidation will be achieved by using the 583 compactor. The 583 compactor will make several passes through the lift to achieve the desired result. This method will be repeated until the excavation is returned to the original lines and grades.

9.3 Site Restoration

Upon completion of excavation backfilling, Site C2 will be restored to pre-work conditions. Existing grass areas, pavements, and facilities damaged during remediation activities will be replaced to pre-work conditions. The site will be graded to pre-work conditions and all disturbed areas will be seeded. Prior to seeding, any previously prepared seedbed areas compacted or damaged by interim rain, traffic, or other causes, will be reworked to restore the ground condition.

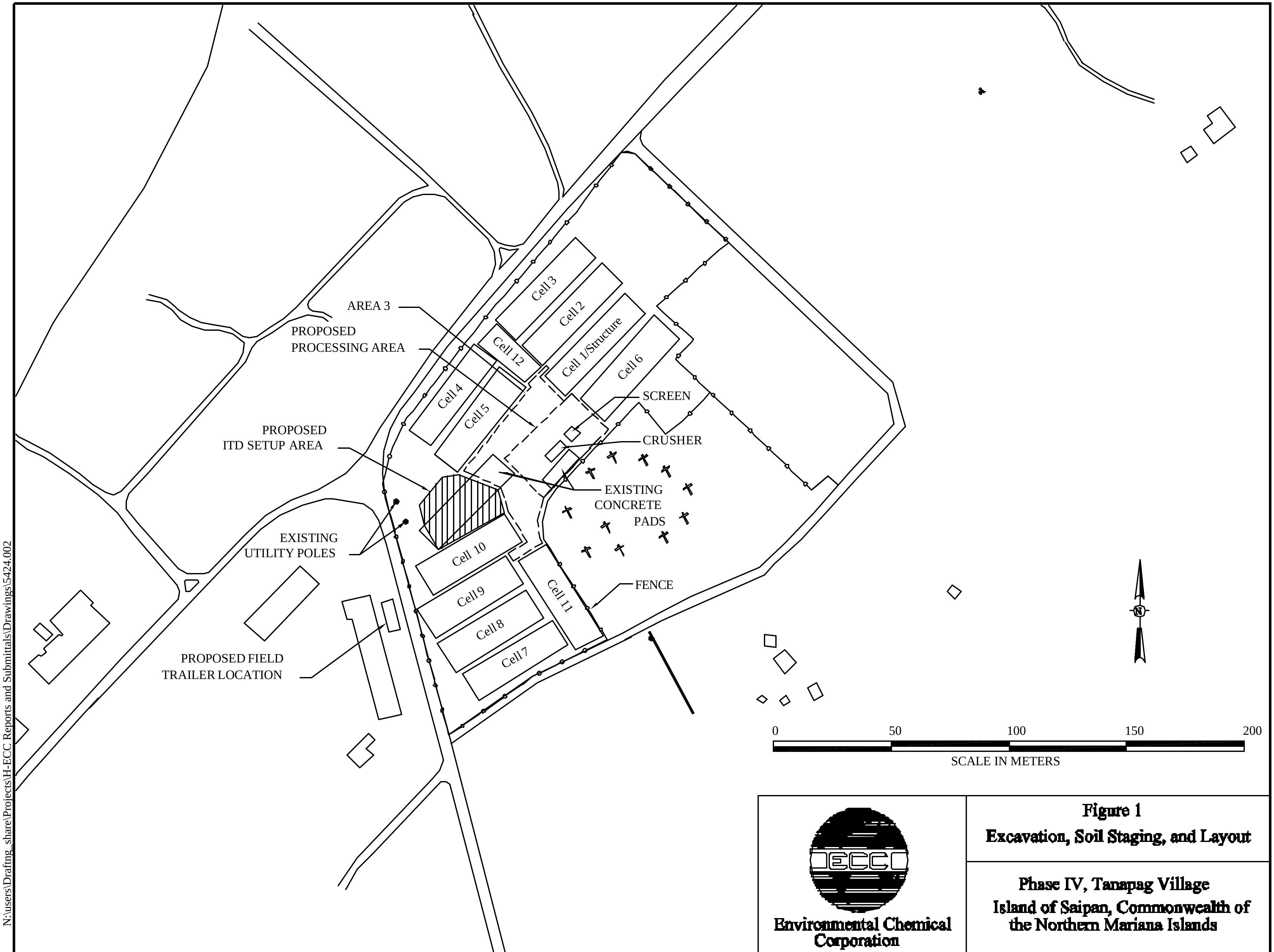
All remaining waste material will be removed during site restoration activities and disposed off-site. Adjacent paved areas will be cleaned. Temporary safety fencing will be removed at the completion of work.

9.4 Final Treated Soil Stockpiles

The treated soils will be stockpiled permanently at Site C2 in two areas: Area of current holding cells 2, 3, 4, 5, and 12; and, Area of current holding cells 7, 8, 9, 10, and 11. These areas will be verified clean before the treated soils will be placed for final placement. The final stockpiles will be compacted to minimum 85 %. A Construction Work Plan will be prepared identifying the construction requirements and specifications.

APPENDIX A

FIGURES



Environmental Chemical Corporation

Figure 1

Excavation, Soil Staging, and Layout

Phase IV, Tanapag Village
Island of Saipan, Commonwealth of the Northern Mariana Islands

N:\users\Draftng_share\Projects\H-ECC Reports and Submittals\Drawings\5424.002

EXCAVATION BACKFILLING APPROVAL FORM

Excavation Area Number:___________________________________

			SAMPLE NUMBERS			

Project Manager Approval:__________________________________Date:_____________

USACE Approval:____ Date:_____________

INTERIM DRAFT OFF-SITE DISPOSAL PLAN

Phase IV
Tanapag Village, Island of Saipan
Commonwealth of the Northern Mariana Islands

Prepared for

Environmental / DoD Support Branch
United States Army Corps of Engineers
Honolulu Engineer District
Building 230
Fort Shafter, Hawaii 96858-5440

Contract No. DACW62-00-D-0001
Delivery Order No. 002

May 2001

Environmental Chemical Corporation
99-1151 Iwaena St.
Aiea, HI 96701

INTERIM DRAFT
OFF-SITE DISPOSAL PLAN

Phase IV
Tanapag Village, Island of Saipan
Commonwealth of the Northern Mariana Islands

May 2001

I hereby certify that the enclosed Off-Site Disposal Plan, shown and marked in this submittal, is proposed to be incorporated with Contract Number DACW62-00-D-0001, Delivery Order 002 Tanapag Village, Phase IV. This Off-Site Disposal Plan is in compliance with contract specifications, EPA, DOT, Maritime shipping and transportation regulations and OSHA requirements, and is submitted for Government approval.

Reviewed by:

____

Project Manager   Date

____

Project Engineer   Date

____

Quality Control Systems Manager   Date

Accepted as a submittal:

____

USACE Contracting Officer   Date

TABLE OF CONTENTS

LIST OF APPENDICES

Environmental Chemical Corporation
99-1151 Iwaena St.
Aiea, HI 96701
May 2001

LIST OF ACRONYMS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CO	Contracting Officer
COR	Contracting Officer Representative
DOT	Department of Transportation
ECC	Environmental Chemical Corporation
EPA	Environmental Protection Agency
ITD	Indirect Thermal Desorption
LTTD	Low Temperature Thermal Desorption
FS	Feasibility Study
PM	Project Manager
PPE	Personal Protective Equipment
RCRA	Resource Conservation and Recovery
SSHO	Site Safety Officer
TSCA	Toxic Substance Control Act
TSD	Toxic Storage and Disposal
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
WP	Work Plan

1.0 INTRODUCTION

This document presents the technical approach proposed by Environmental Chemical Corporation (ECC) for the Phase III Removal Action at Tanapag Village, on the Island of Saipan, Commonwealth of the Northern Mariana Islands, under Contract Number DACW62-00-D-0001, Delivery Order 002. The treatment and disposal tasks of the Phase III Removal Action are designated as Phase IV work. This document is provided to support planning of the Phase IV work.

This Draft Work Plan (WP) has been prepared in accordance with the requirements of the December 20, 2000 Resource Conservation and Recovery Act (RCRA) Section 7003 Unilateral Administrative Order to the Department of Defense/Department of the Army to Clean up Polychlorinated Biphenyl Contamination in Tanapag Village, Saipan (RCRA 7003 Order). It is prepared for review and comment by the United States Environmental Protection Agency (USEPA), Region 9, and is subject to revision pursuant to EPA's comment. It is submitted to meet the due date of June 1, 2001. Separately, a focused Feasibility Study (FS) and Proposed Plan are being prepared in accordance with public participation requirements and 10 USC 2701, in a manner subject to and consistent with section 120 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA).

This WP addresses the off-site disposal elements of the Phase III Removal Action through the completion of soil treatment tasks. Work conducted under this contract will be performed in accordance with all applicable Federal, State, and local laws and regulations. No off-site disposal of material shall begin until the Contracting Officer (CO) reviews and approves this Off-Site Disposal Plan.

1.1 Purpose

The purpose of the Off-Site Disposal Plan is to provide a discussion of products, execution, and transportation pertaining to the disposal of hazardous and non-hazardous materials. The Traffic and Transportation Plan includes handling and packaging methods and procedures for preparing both the hazardous and non-hazardous materials for off-site disposal.

2.0 PRODUCTS

2.1 Equipment

ECC will utilize appropriate vehicles and operating practices to prevent spillage and/or leakage of material from occurring. ECC will have the following equipment on-site to handle potential hazardous material releases:

- Noncombustible absorbent, clay desiccant (Diamond Pro), or floor dry;
- Front-end loader;
- Dump trucks;
- High-volume water pump;
- Water transfer hoses;
- Wash water for decontaminating tools and equipment;
- Drums;
- Solvent for decontamination of tools and equipment;
- Non-sparking shovels and other hand tools; and
- Personal Protective Equipment (PPE) such as polycoated tyvek, nitrile gloves, goggles, caution tape, sheeting, etc.

2.2 Spill Response Action

The procedures developed by USACE in the Technical Memorandum on Spill Response Reporting Procedures (Appendix B) in the Traffic and Transportation Plan will be followed for a spill response action. Generally, the following steps will be taken:

- Notify the Field Superintendent, other management personnel, and the Contracting Officer Representative (COR) immediately;
- Take immediate measures to control and contain the spill;
- Isolate and contain hazardous spill areas;
- Prevent discharge beyond site boundaries;
- Deny entry to unauthorized personnel;
- Do not allow anyone to touch spilled material;
- Perform clean up activities as directed by the Incident Commander/Project Manager using certified personnel;
- Fill out notification form;
- Dispose of contaminated materials;
- Provide a decontamination program to clean previously uncontaminated areas;
- Take samples for analysis to determine that the cleanup is adequate;
- Other actions as needed; and
- Provide a written report to the COR within 24 hours.

2.3 Loading Facilities

Hazardous material, consisting of PCB laden filter cake from the Indirect Thermal Desorption (ITD) process, shall be loaded into commercially available waterproof boxes lined with a 6 mil plastic liner and immediately sealed and stored in 20-foot ocean shipping containers. The ITD process will generate approximately 3 boxes of hazardous material over any 24-hour period or a full container every 4 days.

The containers will be maintained on-site in a non-contaminated area and consigned to a licensed freight forwarder to coincide with published shipping schedules. Each container shall be properly manifested for off-island disposal at the EPA-permitted ECDC Disposal Facility in Utah.

All disposal documentation and packaging shall be in full compliance with applicable rules and regulations, including International Maritime Dangerous Goods Regulations, EPA requirements (40 CFR 761) and Department of Transportation (DOT) Hazardous Material Regulations (49 CFR 172-180) for Class 9 Environmentally Hazardous Substance). The ECC approach to disposal evaluates the most cost-effective TSDF to use and will complies with the CERCLA off-site rule in the selection.

USACE will be listed as the generator and will provide a certified person responsible for signing all required paperwork. The Project Manager (PM) will maintain copies of all disposal documentation paperwork.

No container shall move from the processing and storage area to the harbor facilities without first verifying that the documentation is complete and the container can be immediately loaded on board. The containers will be sent by barge to the Island of Guam where they will be transferred to the scheduled cargo ship for the U.S. Mainland. Subject to barge availability and shipping schedules, the containers will be kept in Guam over several weeks before being loaded on the container ships. During such waiting periods, the containers will be held in secure areas at the Guam port facilities.

In the event of a change in the shipping schedule or loading activity, any container not loaded for shipment shall be returned to the storage facility. No container shall remain within the Saipan harbor facility for a period in excess of 24 hours.

Non-hazardous material generated from the ITD process shall be stockpiled and stored in a non-contaminated area within the site, loaded and transported by covered dump truck to the Puerto Rico landfill on the Island of Saipan for disposal.

3.0 EXECUTION

3.1 General

ECC will be responsible for all record keeping, waste profile sheets, label/mark/package of waste, truck arrivals, material deliveries, and vehicle decontamination. ECC will organize and maintain the material shipment records/manifests required by local authority. Detailed information on record keeping and manifesting is presented in the ECC Material Handling and Package Plan.

ECC will obtain and complete waste profile sheets from the ECDC disposal facility in Utah. The quantity of sheets per contained waste shipment will be in accordance with Federal, State, and local regulations. Each profiled sheet will be submitted to the CO or COR for review and approval. The CO or COR will sign each profile as the "Generator".

Labeling, marking, and packaging of the waste will be in accordance with EPA and USDOT regulations. Each container will have a properly completed manifest for off-island shipment and appropriate placards in place before leaving the site. The words "Environmentally hazardous substances contain reportable quantity of PCBs" will be inserted into bills of lading and/or manifests. To ensure that the waste arrives at the authorized hazardous waste facility, ECC will utilize transporters having proper EPA identification numbers.

ECC will coordinate the schedule for container shipments to the harbor. The schedule will be compatible with the availability of equipment and personnel for material handling operations and with the restrictions stated in the ECC Work Plan and the Specification.

All vehicles will be decontaminated prior to leaving the site in accordance with the ECC Site Safety and Health Plan. Each vehicle leaving the site will be inspected to ensure that no soil adheres to its wheels or undercarriage. All excess soil will be removed at the vehicle decontamination pad.

3.2 Hauling

ECC will not deliver waste to any facility other than the disposal facility listed on the shipping manifest. Vehicle inspection and recording of quantities leaving the site will be coordinated with the CO or COR. The containers sent to the Utah facility will be routed through the Port of Seattle in Washington. The required wording will be inserted into the manifests to indicate that the materials are being sent through the adjoining States.

ECC will be responsible for inspecting the access routes for road conditions, overhead clearance, and weight restrictions. Prior to any off-site shipment, videotape of the condition of all transportation haul roads will be made. Any road(s) damaged on Saipan from project activities will be repaired by ECC at no cost to the Government. ECC will ensure that trucks are protected against contamination by properly routing them through the site to avoid contaminated areas and decontaminating them prior to leaving the site.

3.3 Off-Site Disposal Facilities

The Puerto Rico Landfill will be used for off-site disposal of non-hazardous waste and materials will be moved by covered dump truck as necessary. The ECDC Disposal Facility in Utah will receive the PCB materials. Facility substitutions or facility additions will not be permitted without prior written approval from the CO or COR.

If the identified and approved facility ceases to accept the stated materials or the facility ceases operation, ECC will locate an approved and permitted alternate facility for disposal of materials. ECC will provide the necessary arrangements to utilize the facility. The alternate facility will be approved in writing by the CO or COR in the same manner and with the same requirements as for the original facility.

3.4 Record Keeping

ECC will provide all supporting documentation for manifest preparation to the CO or COR. The documentation will be prepared, reviewed, and approved by an authorized representative of ECC. ECC will obtain manifest forms, obtain material code numbers, and complete the shipment manifest records as required by the appropriate regulatory agencies for verifying the material type and quantity of each load in unit of volume. ECC will certify all manifests and shipping documentation for waste disposal in a format and language similar to that found on a standard manifest form. Copies of each manifest will be submitted to the CO or COR within two days following shipment and within two days after notification of receipt at the permitted disposal facility. Any manifest discrepancies will be reported immediately to the CO or COR and resolved by ECC.

APPENDIX A

ECDC Disposal Facility (Utah)

INTERIM DRAFT TRAFFIC AND TRANSPORTATION PLAN

Phase IV
Tanapag Village, Island of Saipan
Commonwealth of the Northern Mariana Islands

Prepared for

Environmental / DoD Support Branch
United States Army Corps of Engineers
Honolulu Engineer District
Building 230
Fort Shafter, Hawaii 96858-5440

Contract No. DACW62-00-D-0001
Delivery Order No. 002

May 2001

Environmental Chemical Corporation
99-1151 Iwaena St.
Aiea, HI 96701

INTERIM DRAFT
TRAFFIC AND TRANSPORTATION PLAN

Phase IV
Tanapag Village, Island of Saipan
Commonwealth of the Northern Mariana Islands

May 2001

I hereby certify that the enclosed Traffic and Transportation Plan, shown and marked in this submittal, is proposed to be incorporated with Contract Number DACW62-00-D-0001, Delivery Order 002 Tanapag Village, Phase IV. This Traffic and Transportation Plan is in compliance with contract specifications, EPA, DOT, Maritime shipping and transportation regulations and OSHA requirements, and is submitted for Government approval.

Reviewed by:

____
Project Manager Date

____
Project Engineer Date

____
Quality Control Systems Manager Date

Accepted as a submittal:

____
USACE Contracting Officer Date

TABLE OF CONTENTS

LIST OF ACRONYMS

CO	Contracting Officer
COR	Contracting Officer Representative
DOT	Department of Transportation
ECC	Environmental Chemical Corporation
EPA	Environmental Protection Agency
IDW	Investigation Derived Waste
ITD	Indirect Thermal Desorption
PCBs	Polychlorinated Biphenyls
RCRA	Resource Conservation and Recovery Act
PM	Project Manager
SSHO	Site Safety Officer
TSCA	Toxic Substance Control Act
TSD	Toxic Storage and Disposal
USACE	United States Army Corps of Engineer

FIGURES

APPENDICES

1.0 INTRODUCTION

This document presents the technical approach proposed by Environmental Chemical Corporation (ECC) for the Phase III Removal Action at Tanapag Village, on the Island of Saipan, Commonwealth of the Northern Mariana Islands, under Contract Number DACW62-00-D-0001, Delivery Order 0002. The treatment and disposal tasks of the Phase III Removal Action are designated as Phase IV work. This document is provided to support planning and execution of the Phase IV work.

This draft work plan has been prepared in accordance with the requirements of the December 20, 2000 Resource Conservation and Recovery Act (RCRA) Section 7003 Unilateral Administrative Order to the Department of Defense/Department of the Army to Clean up Polychlorinated Biphenyl Contamination in Tanapag Village, Saipan (RCRA 7003 Order). It is prepared for review and comment by The United States USEnvironmental Protection Agency (EPA), Region 9, and is subject to revision pursuant to EPA's comment. It is submitted to meet the revisions due date of 30 May 2001.

This draft Phase IV Work Plan (WP) addresses the traffic and transportation tasks proposed for both the ongoing site maintenance of the existing contaminated cells and the soil excavation and off-site shipping of PCB-contaminated and non-hazardous materials. Work conducted under this contract will be performed in accordance with all applicable Federal, State, and local laws and regulations. No off-site transportation shall begin until the Contracting Officer (CO) or the Contracting Officer's Representative (COR) reviews and approves this Traffic and Transportation Disposal Plan.

1.1 Packaging – Non Hazardous Material

Material being transported off-site for disposal in the Puerto Rico Landfill will include miscellaneous debris, investigation derived debris (IDW), and treated soil not exceeding cleanup criteria. The non-hazardous material will be transported to the land fill facility in dump trucks, the condition and integrity of the which shall be inspected prior to leaving the ECC loading area. Each truck shall be covered before leaving the site.

Manifests will be prepared for all material transported off-site for land fill disposal and will include the following information:

- Type of contents;,
- Waste description; and
- Waste characteristics.

1.1.1 Shipping Guidelines

ECC will comply with the guidelines required by the disposal facility:

- All loads will be accompanied by an appropriate manifest and any required notification/certification forms.

1.1.2 Hauling

ECC will not deliver waste to any facility other than the disposal facility listed on the shipping manifest. Vehicle inspections and recording of quantities will be conducted prior to the truck leaving the site and will be coordinated with the CO or COR. These quantities will be verified with recorded quantities at the disposal facility. If any deviation between the quantity records occurs, the matter will be reported immediately to the CO or COR. Only the transporter subcontracted by ECC, or ECC personnel, will be used for disposal activities. Any use of a substitute or additional transporter will be approved in writing by the CO or COR. ECC will be responsible for inspecting access routes for road conditions, overhead clearance, and weight restrictions. Prior to mobilization to the site, videotape of the condition of transportation haul roads within the local community will be made. Any road(s) damaged during the project activities will be repaired by ECC.

Vehicles that enter known contaminated areas will be decontaminated prior to leaving the site in accordance with the ECC Site Safety and Health Plan. Each vehicle leaving the site will be inspected at the vehicle decontamination pad to ensure that no soil adheres to its wheels or undercarriage. All excess soil will be removed.

1.1.3 Traffic and Transportation Schedule

ECC anticipates that the average daily truck traffic will not exceed three trucks arriving and/or leaving the site. However, during peak periods, no more than 15 trucks will arrive or leave the site on any day. The peak period will not exceed one week. In addition, diesel fuel oil will be delivered to the site on a bi-weekly basis in a tank truck to replenish the fuel supply for the Indirect Thermal Desorption (ITD) system.

ECC will coordinate the schedule for transport of material to the disposal site to meet the approved project schedule. The schedule will be compatible with the availability of equipment and personnel for material handling operations.

1.2 Packaging – Hazardous Material

Hazardous Material being transported off-site for shipment to the ECDC Disposal Facility in Utah will be packaged in commercially available boxes with a 6 mil waterproof liner. Each box will contain one cubic yard of material and weighs approximately 3000 lbs. Each box will be sealed, marked, and stored on-site in a 20-foot ocean going container. After loading each container the integrity of the boxes shall be verified and the container sealed for later transport to the harbor.

ECC will obtain manifest forms, obtain material code numbers, and complete the shipment manifest records as required by the appropriate regulatory agencies for verifying the material type and quantity of each load in unit of volume and weight. ECC will certify all manifests and shipping documentation for waste disposal in a format and language similar to that found on a standard manifest form. Copies of each manifest will be submitted to the CO or COR within two days following shipment and within two days after notification of receipt at the permitted disposal facility. Any manifest discrepancies will be reported immediately to the CO or COR, and resolved by ECC. All disposal documentation and packaging shall be in full compliance with applicable rules and regulations, including International Maritime Dangerous Goods requirements, EPA requirements (40 CFR 761) and DOT Hazardous Material Regulations (49 CFR 172-180) (Class 9 Environmentally Hazardous Substances). USACE will be listed as the generator and will provide a certified person responsible for signing all required paperwork. An alternate representative qualified and available for signing the manifests for the Army will be identified.

The material transported off the Island will be labeled with the words "Environmentally hazardous substances contain reportable quantity of PCBs" and the same wording will be inserted into bills of lading and/or manifests. To ensure that the waste arrives at the authorized hazardous waste TSD facility, ECC will utilize transporters having proper EPA identification numbers.

Treated material exceeding cleanup criteria for polychlorinated byphenols (PCBs) will be shipped to the Envirocare Disposal Facility at the following address: To be provided.

1.2.1 Hauling

ECC will contract with a local freight agent to arrange for shipment of the hazardous materials from the on-site storage location to the harbor loading facility. Shipments of containers will coincide with commercial shipping schedules to ensure containers are quickly loaded on board the ship and do not remain in the harbor facility. Vehicle inspections and recording of quantities will be conducted prior to any truck leaving the site and will be coordinated with the CO or COR. These quantities will be verified with recorded quantities at the disposal facility. If any deviation between the quantity records occurs, the matter will be reported immediately to the CO or COR. Only the transporter subcontracted by ECC or ECC personnel will be used for disposal activities. Any use of a substitute or additional transporter will be approved in writing by the CO or COR.

Vehicles that enter known contaminated areas will be decontaminated prior to leaving the site in accordance with the ECC Site Safety and Health Plan. Each vehicle leaving the site will be inspected at the vehicle decontamination pad to ensure that no soil adheres to its wheels or undercarriage. All excess soil will be removed.

1.2.2 Traffic and Transportation Schedule

ECC anticipates that the average weekly truck traffic will not exceed three trucks arriving and/or leaving the site. ECC will coordinate the schedule for transport of material to the harbor facility with the freight company. The schedule will be compatible with the availability of equipment and personnel for material handling operations.

1.3 Hours of Operation

Hours of operation during remediation activities will be 7:00 am to 7:00 pm, with no machinery noise before 8 am. No work activities will begin before 8:00 am and continue after 8:00 pm, except the Low Temperature Thermal Desorption system.

1.4 Haul Routes

Prior to initiating remediation activities, ECC will notify the appropriate local authorities of transportation activities involving the transportation of large equipment and hazardous waste to and from the site. Additional notification of subsequent transportation activities is not required. The truck route to the Port of Saipan and the Puerto Rico Landfill are shown in Figure 1.

1.5 On-Site Spill Response

ECC will utilize appropriate vehicles and operating practices to prevent spillage and/or leakage of contaminated material from occurring enroute to the disposal facility. In the event of a spill or leak during transportation to the disposal facility, the procedures defined in the USACE Technical Memorandum on Spill Response Reporting Requirements will be followed. These protocols and requirements are shown in Appendix A.

1.6 Contingency Plan

In the event that the shipment is damaged in transit or does not meet acceptance criteria at the disposal facility, Mr. Kevin McCaskill, Project Manager, will be notified. Mr. McCaskill can be reached by pager 24-hours a day at 888/602-2901. Mr. McCaskill will coordinate the return of material.

FIGURES

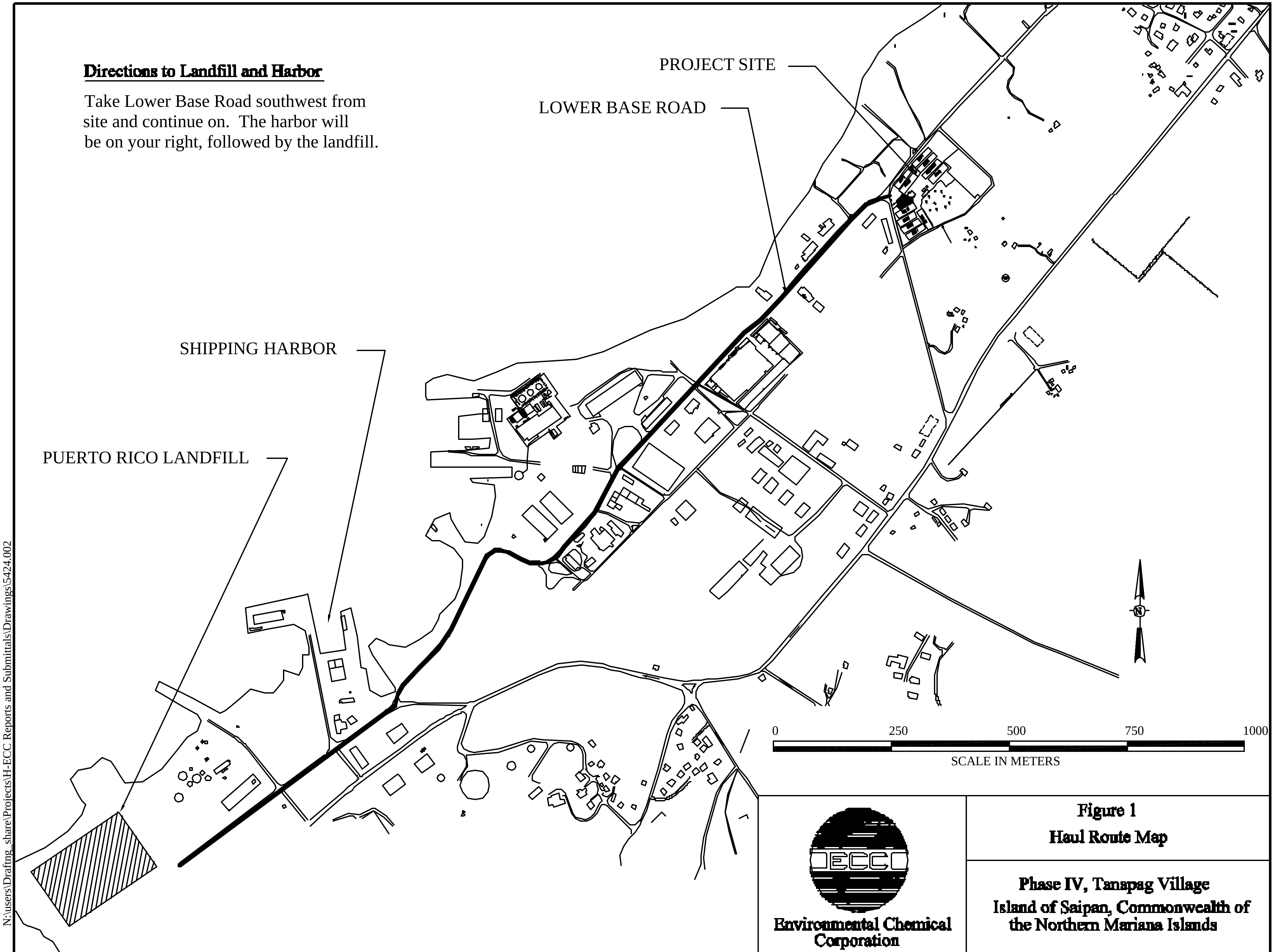


Figure 1

Haul Route Map

Phase IV, Tanapag Village
Island of Saipan, Commonwealth of the Northern Mariana Islands

N:\users\Draftng_share\Projects\H-ECC Reports and Submittals\Drawings\5424.002

Appendix A
Technical Memorandum on Spill Response Reporting Procedures, USACE

CEMP-RT (200-1a) 20 Jul 1995

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Spill Reporting Procedures for USACE Personnel Involved in HTRW Projects

1. Purpose: This memorandum identifies and establishes guidance for compliance regarding spill reporting procedures by USACE elements, and their contractors responsible for executing HTRW activities, including investigation, design, construction, and other related activities at HTRW sites.

2. Applicability. This memorandum applies to HQUSACE elements executing HTRW, major subordinate commands, districts, laboratories, and field operating activities performing or contracting HTRW site activities.

This document is not intended to replace substantive regulatory requirements, but only to summarize certain key reporting provisions. The reader is cautioned to read the applicable regulations in conjunction with the use of this document. For Civil Works Spill Reporting Procedures, refer to USACE Operated Facilities Environmental Compliance Guidance Letter No. 2, Spill Planning and Response, which is under revision.

3. References - See Appendix A.

4. Key Definitions - See Appendix B.

5. CFR Reporting Requirements - See Appendix C.

6. Background.

a. Over the past several years, there has not been a standard internal spill reporting procedure. As the HTRW program expands and the diversity of programs and customers continues, it is important to establish a standard internal spill reporting procedure for HTRW work.

b. As discussed herein, there are many different environmental regulations that require spill reporting and notification to regulatory agencies. The requirements vary and are somewhat confusing in nature. The purpose of this policy is to outline the major reporting requirementsan delineate reporting responsibilities based on our customer's needs.

c. As spill reporting is required under various environmental statutes, it is imperative that Corps personnel are knowledgeable about the spill reporting requirements, and that the Corps standardizes reporting procedures.

7. Spill Reporting Requirements. - The following table provides a brief summary of the spill reporting requirements:

Table 1 - Notification Requirements

Event:	Who Must Report:	Reporting is Required to:	When is Reporting Required?	CFR Source:
Oil Discharge	**Any person in charge of a vessel, or of an onshore or offshore facility.**	**National Response Center (NRC) at 1-800-424-8802**	**Oil has been released into the waters of the United States**	**40 CFR 110, Discharge of Oil**
Release of a Hazardous Substance	**Any person in charge of a vessel or an offshore or an onshore facility.**	**National Response Center (NRC) at 1-800-424-8802**	**Release of a reportable quantity (RA) of a hazardous substance occurs during any 24 hours period. See 40 CFR 302 for list.**	**40 CFR 302, Designation, Reportable Quantities and Notification 103(a)**
Past Releases of a Hazardous Substance	**Any person with knowledge of a release when a hazardous substance is discovered.**	**EPA Administrator**	*** See footnote regarding when reporting is required**	**Past Releases CERCLA 103 (c) Notification**
Hazardous Substance or Extremely Hazardous Substance Chemical Reporting	**The owner or operator of a facility (or facility response coordinator).**	**Immediately notify the Community Emergency Coordinator for the Local Emergency Planning Committee (LEPC) OR 911 and the State Emergency Response Commission (SERC)**	**Release of a reportable quantity of a CERCLA hazardous substance or an extremely hazardous substance (EHS) during any 24 hour period.**	**40 CFR 355, Emergency Planning and Notification for Extremely Hazardous Substances**

Hazardous Chemical Reporting Community Right-to-Know	**Any facility that produces, uses or stores 10,000 lbs of OSHA hazardous chemicals and/or EHS in an amount greater than or equal to 500 lbs or the TPQ, whichever is less.**	**The owner/operator must submit Tier I/II reports to the fire department, LEPC and SERC**	**Tier I/II Reports must be submitted by 1 March of each year.**	**40 CFR 370, Hazardous Chemical Reporting Community Right-to-Know**
Toxic Chemical Release Reporting	**If there are 10+ employees at that facility and 10,000 lbs or more of a toxic chemical used or stored there, the owner/operator of the facility reports to EPA, and also the state the facility is located in.**	**Report to EPA using Form R. There are also recordkeeping requirements in 40 CFR 372.10.**	**Form R Report must be submitted on or before 1 July of the next year.**	**40 CFR 372, Toxic Chemical Release Reporting: Community Right-to-Know**
Poly-chlorinated Biphenyls (PCBs)	**Anyone responsible for the spill, having knowledge of a spill, or discovers a spill.**	**. National Response Center at 1-800-424-8802** **. EPA Regional Ofc (within 24 hrs of discovery)** **. EPA Regional Ofc (within 24 hrs of discovery)** **. NRC & EPA Regional Ofc**	**. Any spill equal to 1 pound or more of PCBs** **. Any spills into any water/water source; and if over 1 lb, notify the NRC.** **. Any spills on grazing lands or gardens; and if over 1 lb, notify the NRC** **. Any spill equal to 10 pounds or more by weight of PCBs.**	**40 CFR 761, Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions**

DOT Hazardous Materials Trans- portation	**Any carrier/ Transporter responsible for the transportation of hazardous materials.**	**Dept of Transportation at 1-800-424-8802**	**- Death or personal injury requiring hospitalization - Property damage over $50,000 - Public evacuation, major transportation arteries or facilities affected for one or more hours - Aircraft flight patterns altered - Fire, breakage, spillage, or contamination involving radioactive material (>70 Bq/g) or etiologic agents - Release of a marine pollutant exceeding 119 gallons for liquid or 882 pounds for solids - Dangerous situation exists as a result of the incident that does not meet previous criteria**	**40 CFR 171, Subchapter C - Hazardous Materials Regulations**

*CERCLA 103(c) notification requirements are as follows:

"Within 180 days after *December 11, 1980*, any person who owns or operates or who at the time of disposal owned or operated, or who accepted hazardous substances for transport and selected, a facility at which hazardous substances are or have been stored, treated, or disposed of shall, unless such facility has a permit issued under, or has been accorded interim status under, subtitle C of the Solid Waste Disposal Act, *notify the Administrator of EPA* of the existence of such facility, specifying the amount and type of any hazardous substance to be found there, and any known, suspected, or likely releases of such substances from such facility"

8. USACE Spill Reporting Responsibilities. - Since the Corps of Engineers does work for many different customers, the person or agency responsible for reporting spills may vary depending upon the party having jurisdiction over or ownership of the real property or the facility, as that term is broadly defined in CERCLA, or statutory and regulatory requirements involved. In all cases, USACE employees will report spills as required by statute and regulation. Just notifying the customer does not relieve the liability of the Corps or contractor personnel on

site who have knowledge of the incident. It is recommended that USACE personnel consult with the Office of Counsel regarding such requirements prior to undertaking management of a project.

During the study and design phase the Corps Representative may be the program manager, chemist, geologist, industrial hygienist, or other individual representing the Corps during this phase of work. During the remediation phase, the Construction Representative serves as the Corps Representative. Below is the USACE Spill Reporting Responsibility Matrix for HTRW work. A summary table is provided at Table 2.

a. Formerly Used Defense Sites (FUDS).

(1) In all cases, USACE employees will report spills as required by statute and regulation. It is recommended that USACE personnel consult with the Office of Counsel regarding such requirements prior to undertaking management of a project.

(2) Contract language may require the contractor to report all spills as the operator of the facility. If this is the case, the contractor shall then be required to notify the Corps within one hour of the contractor completing spill reporting requirements to the required authorities.

b. Installation/Restoration of Sites under the Installation Restoration Program (IRP).

(1) In all cases, USACE employees will report spills as required by statute and regulation. Just notifying the installation on-scene coordinator (IOSC) does not relieve the liability of the Corps or contractor personnel on site who have knowledge of the incident. It is recommended that USACE personnel consult with the Office of Counsel regarding such requirements prior to undertaking management of a project.

(2) Reporting a spill of oil or a hazardous substance on Army installations will be in accordance with Chapter 8, Oil and Hazardous Substances Spill Contingency Planning, Control, and Emergency Response, AR 200-1, Environmental Enhancement and Protection.

c. Environmental Support for Others Sites (ESFO). In all cases, USACE employees will report spills as required by statute and regulation. The Corps Representative will provide written notification to the customer that the Corps will report any spills that occur on site to the required reporting agency. Just notifying the customer does not relieve the liability of the Corps or contractor personnel on site who have knowledge of the incident. It is recommended that USACE personnel consult with the Office of Counsel regarding such requirements prior to undertaking management of a project.

d. Superfund Sites. The Corps Representative will provide written notification to the EPA On Scene Coordinator (OSC) or Regional Project Manager (RPM) that the Corps will report any spills that occur on site to the required reporting agency. If the EPA OSC or RPM does not want the Corps to handle notification, they are to notify the Corps in writing, preferably prior to initiation of any site work.

e. The following table provides a brief summary of spill reporting requirements on Corps of Engineers sites.

Table 2. Spill Reporting on Corps of Engineers Sites

Formerly Used Defense Site (FUDS) and Formerly Utilized Sites Remedial Action Program (FUSRAP) {added 7/99}	**. Corps Representative reports all spills to the required reporting agency** **. As an alternative, contract language may require the contractor to report spills to the regulatory agency and then notify the Corps in writing within one hour of making notification.**
Installation Restoration Site (IRP)	**. Corps employees will report spills as required by AR 200-1, Environmental Enhancement and Protection, as well as by other applicable statutes and regulations.**
Environmental Support for Others (ESFO)	**. Corps employees will report spills as required by statute and regulation.**
Superfund Site	**. The Corps representative reports spills to the required reporting agency for all Corps managed activities at the site. A follow-up report to the EPA OSC or RPM will be made as soon as possible.** **. EPA assumes reporting responsibility via written notification prior to initiation of any site work. In this case, the Corps will report spills or releases to the EPA OSC or RPM telephonically, and consistent with regulations or statutory requirements. A written report will follow to EPA within 24 hours.**

9. Actions to be Taken.

a. Special Contract Provisions.

(1) All contract specifications for HTRW site remedial actions shall contain a section which outlines contractor responsibilities regarding spill reporting requirements.

(2) If it is decided that the contractor shall be required to report all spills directly to the appropriate authorities, contract specifications must include appropriate language, such as:

"The contractor is required to make all spill notifications under state, federal and local regulations, including, but not limited to 40 CFR 110, 302, 355, 370, 372, etc., immediately upon discovery, to appropriate regulatory authorities. Within one hour of notification to regulatory authorities, the contractor shall verbally notify the Corps Representative. Within 24 hours the contractor shall submit a written report to the Corps Representative which contains the information required from the spill notification information list (Enclosure 1) and spill notification checklist (Enclosure 2)."

(3) If it is determined that the Corps Representative shall report spills, the following requirement or similar language shall be added to the contract:

"The contractor will notify the Corps immediately upon discovery of any spill/release. The contractor shall follow-up within 24 hours with a spill report. A spill report shall contain at a minimum the lines required in enclosure 1."

b. Training Provisions.

(1) Each district shall ensure that all USACE personnel involved in on-site activities at HTRW sites (including State-Lead and PRP-Lead for oversight activities) are familiar with, comply with, and have obtained copies of the Spill Reporting Requirements contained in this memorandum.

(2) Ensure, in coordination with other USACE Command functional activities, (i.e., engineering, personnel, etc.), that involved USACE personnel have received appropriate training as required by USACE policies.

(3) Ensure that USACE staff elements and USACE Commands are familiar with spill reporting procedures and these requirements are met during investigation,remediation and other engineering related activities at HTRW sites.

c. District Reporting Requirements.

(1) Each district shall prepare and approve a written policy outlining the spill reporting requirements identified in this policy.

(2) The policy shall further delineate the Corps field, district, and division reporting chain-of-command.

10. Our POC is Brian Peckins, CEMP-RT at (202) 761-4707.

FOR THE DIRECTOR OF MILITARY PROGRAMS:

/s/
2 Encls CARY JONES
Chief, Environmental Restoration Division

DISTRIBUTION:
CEMP
CECW
Commanders,
MSCs
Districts

Appendix A - References

a. 40 CFR 110, Discharge of Oil

b. 40 CFR 302, Designation, Reportable Quantities and CERCLA 103(a) Notification

c. CERCLA 103(c) Notification for Past Releases

d. 40 CFR 355, Emergency Planning and Notification

e. 40 CFR 370, Hazardous Chemical Reporting: Community Right-to-Know

f. 40 CFR 372, Toxic Chemical Release Reporting: Community Right-to-Know

g. 40 CFR 761, Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions

h. 49 CFR 171, Subchapter C, Department of Transportation Hazardous Materials Regulations

Appendix B - Key Definitions

a. The term "Discharge" means any intentional or unintentional spilling, leaking, pumping, pouring, emitting, emptying, or dumping that is caused by events occurring within the scope of relevant operating or treatment systems.

b. The term "Environment" includes water, air, and land and theinterrelationship which exists among and between water, air, and land and all living things.

c. The term "Extremely Hazardous Substance" means a substance listed in Appendices A and B of 40 CFR 355, Emergency Planning and Notification.

d. The term "Facility" means (i) any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, or (ii) any site or area where a hazardous substance has been deposited, stored, disposed of, or placed, or otherwise come to be located; but does not include any consumer product in consumer use or any vessel.

e. The term "Hazardous Chemical" means any hazardous chemical as defined under section 1910.1200(c) of Title 29 of the Code of Federal Regulations, except that such term does not include the following substances ... Any substance to the extent it is used in a research laboratory or a hospital or other medical facility under the direct supervision of a technically qualified individual.

f. The term "Hazardous Substance" means any substance designated by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Resource Conservation Recovery Act (RCRA), Clean Water Act (CWA), any pollutant listed under Clean Air Act (CAA), or any imminently hazardous chemical substance under Toxic Substances Control Act (TSCA). The term does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance, or natural gas, natural gas liquids, liquified natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas).

g. "MSDS" or Material Safety Data Sheet is the document containing the chemical name or the common name of each chemical plus the hazardous component of each such chemical, as well as handling and disposal information. This sheet is required under OSHA for each hazardous chemical located at a site.

h. The term "Navigable Waters" means the waters of the United States, including the territorial seas.

i. The "National Contingency Plan" (NCP) (40 CFR Part 300) is the document designed to provide the basic blueprint for the entire CERCLA response program. The NCP reflects the latest of EPA's detailed cleanup and response policies and procedures.

j. The term "Offshore Facility" means any facility of any kind located in, on, or under any of the navigable waters of the United States, and any facility of any kind that is subject to the jurisdiction of the United States and is located in, or on, or under any other waters, other than a vessel or a public vessel.

k. The term "Oil" means oil of any kind or in any form, including, but not limited to, petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil.

l. The term "Onshore Facility" means any facility (including, but not limited to, motor vehicles and rolling stock) of any kind located in, on, or under any land omonnavigable waters within the United States.

m. The term "Owner/Operator" means (i) in the case of a vessel, any person owning, operating, or chartering by demise, the vessel, (ii) in the case of an onshore facility or an off-shore facility, any person owning or operating such facility, and (iii) in the case of any facility, title or control of which was conveyed due to bankruptcy, foreclosure, tax delinquency, abandonment, or similar means to a unit of State or local government, any person who owned, operated or otherwise controlled activities at such facility immediately beforehand.

n. "PCBs" means polychlorinatedbiphenyls as definedunder 40 CFR 761.3. As specified under 40 CFR 761.1(b), no requirements may be avoided through dilution of the PCB concentration.

o. The term "Person" means an individual, firm, corporation, association, partnership, consortium, joint venture, commercial entity, United State Government, State, municipality, commission, political subdivision of a State, or any interstate body.

p. The term "Release" means any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, abandoning, or disposing into the environment.

q. The term "Reportable Quantity" means that quantity, as set forth in 40 CFR 302, the release of which requires notification to the National Response Center (NRC).

r. Under TSCA, the term "Responsible Party" means the owner of the PCB equipment, facility, or other source of PCBs or his/her designated agent (e.g., a facility manager or foreman).

s. The term "Sheen" means an iridescent appearance on the surface of the water caused by oils, petroleum products, etc.

t. As defined by TSCA, the term "Spill" means both intentional and unintentional spills, leaks, and other uncontrolled discharges where the release results in any quantity of PCBs or hazardous substances running off or about to run off the external surface of the equipment; or other PCB source, as well as contamination resulting from those releases.

u. The term "Spill Event" means a discharge of oil into or upon the navigable waters of the United States or adjoining shorelines in harmful quantities, as defined in 40 CFR 110. According to 40 CFR 110.3, harmful quantities include discharges of oil that (a) violate applicable water quality standards, or (b) cause a film or sheen upon or discoloration of the surface of the water or adjoining shorelines or cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines.

v. The term "Sludge" means an aggregate of oil or oil and other matter of any kind in any form other than dredged spoil having a combined specific gravity equal to or greater than water.

w. The term "Threshold Planning Quantity (TPQ)" means, for a substance listed in Appendices A and B of 40 CFR 355, the quantity listed in the column "threshold planing quantity" for that substance.

x. The term "United States" includes the several States of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, and Commonwealth of the NorthernMarianas, and any other territory or possession over which the United States has jurisdiction.

y. The term "Vessel" means every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water other than a public vessel.

Appendix C - Application of CFR Reporting Requirements.

a. ***40 CFR 110 Discharge of Oil***.

(1) Application of 40 CFR 110. This section of the CFR applies to the discharge of oil. This includes certain discharges into or upon the navigable waters of the United States or adjoining shorelines, with the exception from a properly functioning vessel engine.

(2) Who is Required to Report? Any person in charge of a vessel or of an onshore or offshore facility is responsible for reporting releases of oil to the National Response Center (NRC) at 1-800-424-8802 as soon as he/she has knowledge of the release. (If direct reporting to the NRC is not practical, reports may be made to the Coast Guard or the EPA predesignated On-Scene Coordinator (OSC) for the geographic area where the discharge occurs.)

(3) When is Reporting Required? Reporting to the NRC is required if the release violates an applicable water quality standard; causes a film or sheen upon or discoloration of the surface of the water; causes a film or sheen on adjoining shorelines; or causes a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines. (There is an exception, however, for discharges of oil from properly functioning vessel engines, but discharges from the vessel's bilges are not exempt.)

b. ***40 CFR 302 Designation, Reportable Quantities, and Notification of CERCLA Hazardous Substances.***

(1) Application of 40 CFR 302. This section of the CFR identifies reportable quantities for various substances, including hazardous substances, and the notification requirements for release of these substances. The list of hazardous substances and their corresponding reportable quantities are in a table in 40 CFR 302.4. The table includes an alphabetical listing of chemicals and entries for all hazardous wastes.

(2) Who is Required to Report? Any person in charge of a vessel or an offshore or an onshore facility shall, as soon as he/she has knowledge of the release (other than a federally permitted release or application of a pesticide) should immediately notify the National Response Center (NRC) at 1-800-424-8802; in Washington, D.C. (202) 426-2675.

(3) When is Reporting Required? Reporting is required when a release of a reportable quantity of a hazardous substance occurs during any 24-hour period. The report must be made immediately by calling the NRC.

c. ***40 CFR 355 Emergency Planning and Notification.***

(1) Application of 40 CFR 355. This section of the CFR applies to any facility that produces, processes, uses or stores an extremely hazardous substance (EHA) in amounts equal to or in excess of their threshold planning quantity (TPQ). The lists of extremely hazardous

substances and their threshold planning quantities are in Appendix A and B to Part 355. Executive Order 12856; "Federal Compliance With Right-to-Know Laws and Pollution Prevention Requirements," made all Federal agencies and facilities responsible with complying with the "Emergency Planning and Community Right-to-Know Act" (EPCRA) (40 CFR 355, 370, 372).

(2) Who is Required to Report? First, the owner or operator of a facility should designate an emergency coordinator. The owner or operator (or facility response coordinator) will immediately notify the community emergency coordinator for the Local Emergency Planning Committee (LEPC) or "911" **and** the State Emergency Response Commission (SERC). (Refer to 40 CFR 355.40(b) for correct notification requirements.) Regulatory deadlines are past for Federal agencies and facilities to have made emergency planning notification to the State and local planning groups and to designate the facility emergency coordinator. A Formerly Used Defense Site (FUDS) remediation will need to make reporting a requirement of the contractor, or the Corps Construction office will need to perform this task.

(3) When is Reporting Required? Emergency release notification is required at any facility where a hazardous chemical is produced, used, or stored and at which there is a release of a reportable quantity (RQ) of any extremely hazardous substance (EHS) or CERCLA hazardous substance. The notification requirements can be found in 40 CFR 355.40. Notification is not necessary for any release which results in exposure to persons solely within the boundaries of the facility. The reader is cautioned to be careful when determining notification is not required since regulators may be conservative in evaluating if the release remained on the facility site.

d. ***40 CFR 370 Hazardous Chemical Reporting: Community Right-to-Know.***

(1) Application of 40 CFR 370. This CFR establishes reporting requirements which provide the public with important information on the hazardous chemicals in their communities for the purpose of enhancing community awareness of chemical hazards, and facilitating development of State and local emergency response plans.

(2) Who is Required to Report? Any facility that has present at anyone time 10,000 pounds of OSHA hazardous chemicals and/or extremely hazardous substance (EHS) in an amount greater than or equal to 500 pounds or the threshold planning quantity (TPQ), which is less, is subject to reporting. This reporting requirement is not applicable to hazardous wastes or constituents.

(3) When is Reporting Required? If a facility meets any one of these levels, the owner/operator must submit Tier I/II Reports to the fire department, LEPC, and SERC by 1 March of each year. There are also additional MSDS reporting requirements, and Inventory Reporting requirements. (Hazardous chemicals are defined to be all chemicals that pose a physical or health hazard **except** for hazardous waste subject to RCRA regulation, any substance to the extent it is used for personal, family or household purposes, or is present in the same form and concentration as a product packaged for distribution and use by the general public (i.e., paint,

glue, etc.), tobacco products, wood products, consumer products, etc. Items such as gasoline, oils, heating oils, diesel fuel, solvents would be covered under this part.

e. ***40 CFR 372 Toxic Chemical Release Reporting: Community Right-to-Know***

(1) Application of 40 CFR 372. This portion of the CFR requires that the general public and surrounding communities be notified of any release pertaining to any toxic chemicals. There are also notification requirements for suppliers regarding distribution of mixtures. Subpart D of 40 CFR 372.65 contains a list of Toxic Chemicals.

(2) Who is Required to Report? Owners or operators of the facility are required to comply with reporting requirements to EPA and to the State in which the facility is located if that facility employees 10 full-time employees (including contract and part-time employees) who work at the facility **and** if 10,000 pounds or more of a toxic chemical are used or stored at the facility in a calendar year. The threshold for reporting if the Federal facility is manufacturing or processing toxic chemicals is 25,000 pounds.

(3) What Reporting is Required? Facilities in this position are required to report to EPA using EPA Form R. Each Form R report covers activities that occurred during a calendar year at a covered facility and must be submitted on or before July 1st of the next year. There are recordkeeping requirements in 40 CFR 372.10. The facility must also file a Toxic Chemicals Source Reduction and Recycling Report. There are some exemptions that may be applicable to Federal facilities or agencies. Routine janitorial cleaning supplies, fertilizers, and pesticides similar in type or concentration to consumer products used for janitorial and facility grounds maintenance are exempt. Chemicals used for the purpose of maintaining vehicles operated at the facility are exempt if certain criteria are met (40 CFR 372.38).

f. ***40 CFR 761 Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, and Distribution in Commerce, and Use Prohibitions.***

(1) Application of 40 CFR 761. This section of the CFR regulates the use, storage, and disposal of PCBs at concentrations of 50 parts per million (ppm) or greater. Spills containing concentrations of 50 ppm or more PCBs are regulated under this policy, as well as uncontrolled discharges of PCBs occurring after May 4, 1987. Spills occurring before this date should follow the existing regional standards.

(2) Who is Required to Report? Anyone responsible for the spill, having knowledge of a spill, or who discovers a spill.

(3) When is Reporting Required? Reporting requirements for PCB spills are shown in the following table:

Table 3 - PCB Reporting Requirements

If 1 lb or more of PCBs or PCB contaminated material is spilled	Notify the National Response Center (NRC) at 1-800-424-8802
If any amount of PCBs or PCB material directly contaminates surface water, sewers, or drinking water supplies	Notify the appropriate EPA regional office (Office of Prevention, Pesticides and Toxic Substances Branch); and **if over 1 lb,** notify the NRC
If any amount of PCBs or PCB material directly contaminates grazing lands or vegetable gardens	Notify the appropriate EPA regional office (Office of Prevention, Pesticides and Toxic Substances Branch); and **if over 1 lb**, notify the NRC
If 10 lbs or more PCBs or PCB contaminated material is spilled	Notify the appropriate EPA regional office (Office of Prevention, Pesticides and Toxic Substances Branch); and **if over 1 lb**, notify the NRC

Although the regulations require reporting to the appropriate EPA regional office within 24 hours, this may not be possible at night, on holidays, or during weekends. Keep a record of attempts to contact EPA, and contact them as soon as possible.

g. ***49 CFR 171 General Information, Regulations, and Definitions.***

(1) Application of 49 CFR 171. This section of the CFR prescribes the requirements of the Department of Transportation (DOT) governing the transportation of hazardous materials.

(2) Who is Required to Report? Any carrier/transporter responsible for the transportation of hazardous materials (including hazardous wastes), including the loading, unloading and temporary storage is required to report spills. The carrier should notify the DOT (1-800-424-8802) at the earliest practical moment. Notice involving etiological agents may be given to the Center of Disease Control (404) 633-5313 in place of notice to DOT. (Also, under 40 CFR 302.6, EPA requires persons in charge of facilities (including transport vehicles, vessels, and aircraft) to report any release of a hazardous substance in a quantity equal to or greater than its reportable quantity, as soon as that person has knowledge of the release, to the NRC.)

(3) When is Reporting Required? The carrier shall report when:

(a) As a direct result of hazardous materials --

. A person receives injuries requiring hospitalization, or a person is killed;

. An estimated carrier or other property damage exceeds $50,000;

. An evacuation of the general public occurs lasting one or more hours;

. One or more major transportation arteries or facilities are closed or shut down for one hour or more;

. The operational flight pattern or routine of an aircraft is altered.

(b) Fire, breakage, spillage, or suspected radioactive contamination occurs involving shipment or radioactive material; or fire, breakage, spillage, or suspected contamination occurs involving shipment of etiologic agents; or

(c) A situation exists of such a nature that, in the judgement of the carrier, it should be reported to the Department even though it does not meet the above criteria of this section.

h. ***CERCLA 103(c) Notification of Past Releases***

It is important to remember that the NRC reporting requirement is triggered **only** when a reportable quantity is released during a 24-hour period under CERCLA 103(a) notification. This can usually only be established for ongoing or fairly recent releases. For releases that are as a result of abandoned hazardous waste, USTs, leaking landfills, etc., it is difficult to determine if a Reportable Quantity (RQ) has been released into the environment within a 24-hour period. Contamination from past releases may have resulted from small but continuous releases over a prolonged period of time. Therefore, in addition to providing a mechanism for reporting current spills, CERCLA ensures that past releases are also reported. Whereas current releases must be immediately reported to the National Response Center under Section 103(a) of CERCLA and 40 CFR 302, Section 103(c) of CERCLA requires sites known or suspected to have received hazardous substances to be reported to EPA, but does not specify a time frame. This is ordinarily covered through the consultation process which occurs with EPA as part of the Defense Environmental Restoration Program (DERP) and/or through submission of Preliminary Assessment Report to EPA.

U.S. ARMY CORPS OF ENGINEERS
SPILL NOTIFICATION INFORMATION LIST

To the extent possible, when a spill/release is reported the following information should be recorded and provided during notification:

. Name, address, and telephone number of reporting individual.
. Date and time of day the spill was reported.
. Names of an individual and/or agency the spill was reported to.
. Names of individual who can be contacted for further information.
. Date and time the incident occurred or was discovered.
. Name of the party or individual responsible for the incident.
. Mailing address and telephone number of the responsible party.
. Specific geographic location of the incident.
. Name of material spilled or released.
. Sources of the spilled material.
. Cause of the release.
. Total quantity released.
. Whether material was released to air, ground, water, or subsurface.
. Amount spilled into water.
. Weather conditions.
. A vessel name, rail car/truck number or other identifying information.
. Name of carrier.
. Number and type of injuries or fatalities.
. Whether evacuations have occurred.
. Estimated dollar amount of property damage.
. Description of clean-up action taken and future plans.
. Other agencies that have been notified or will be immediately notified.
. Whether there are any known or anticipated acute or chronic health risks associated with the emergency, and where appropriate, advice regarding medical attention necessary for exposed individuals.
. Proper precautions to take as a result of the releases during evacuation.
. Natural resources which may be affected.
. Land owners.
. Name of individual/agency to which the spill was reported.
. Time of day, and date the spill was reported.

U.S. ARMY CORPS OF ENGINEERS
SPILL NOTIFICATION CHECKLIST

________ **++ Discharge/Spill Observed**

Date: ____

Location: ____

Recorder: ____

________ **++ Call the National Response Center (1-800-424-8802)**

Note: *If direct reporting to the NRC is not practicable, Reports may be made to the EPA Regional Office*

EPA Region Emergency Number: ____________________
Notification to NRC made by: ____________________
Time of Notification: ____________________
Date of Notification: ____________________
Name of Person at LEPC: ____________________

________ **++ Call the Local Emergency Planning Committee (LEPC)**

Telephone Number of LEPC: ____________________
Notification to LEPC made by: ____________________
Time of Notification: ____________________
Date of Notification: ____________________
Name of Person at LEPC: ____________________

________ **++ Call the State Emergency Response Commission (SERC)**

Telephone Number of SERC: ____________________
Notification to SERC made by: ____________________
Time of Notification: ____________________
Date of Notification: ____________________
Name of Person at SERC: ____________________

Note: *Notice to the LEPC and SERC are required by SARA Title III.*

________ **++ Call your District Chain-of-Command Office**

Telephone Number of Office: ____________________
Notification made by: ____________________
Time of Notification: ____________________
Date of Notification: ____________________
Name of Person at District Ofc: ____________________

INTERIM DRAFT SECURITY PLAN

Phase IV Removal Action
Tanapag Village, Island of Saipan
Commonwealth of the Northern Mariana Islands

Prepared for

Environmental / DoD Support Branch
United States Army Corps of Engineers
Honolulu Engineer District
Building 230
Fort Shafter, Hawaii 96858-5440

Contract No. DACW62-00-D-0001
Delivery Order No. 002

May 2001

Environmental Chemical Corporation
99-1151 Iwaena St.
Aiea, HI 96701

INTERIM DRAFT
SECURITY PLAN

Phase IV Removal Action
Tanapag Village, Island of Saipan
Commonwealth of the Northern Mariana Islands

May 2001

I hereby certify that the enclosed Security Plan, shown and marked in this submittal, is that proposed to be incorporated with Contract Number DACW62-00-D-0001, Delivery Order 002 Tanapag Village, Phase IV. This Security Plan is in compliance with contract specifications and OSHA requirements, and is submitted for Government approval.

Reviewed by:

____

Project Manager Date

____

Project Engineer Date

____

Quality Control Systems Manager Date

Accepted as a submittal:

____

USACE Contracting Officer Date

TABLE OF CONTENTS

LIST OF ACRONYMS

COR	Contracting Officer Representative
ECC	Environmental Chemical Corporation
EPA	Environmental Protection Agency
ITD	Indirect Thermal Desorption
PM	Project Manager
QCSM	Quality Control System Manager
RCRA	Resource Conservation and Recovery Act
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
USACE	United States Army Corps of Engineers
WP	Work Plan

1.0 INTRODUCTION

This document presents the technical approach proposed by Environmental Chemical Corporation (ECC) for the Phase III Removal Action at Tanapag Village, on the Island of Saipan, Commonwealth of the Northern Mariana Islands, under Contract Number DACW62-00-D-0001, Delivery Order 002. The treatment and disposal tasks of the Phase III Removal Action are designated as Phase IV work. This document is provided to support planning of the Phase IV work of the removal action.

This Draft Work Plan (WP) has been prepared in accordance with the requirements of the December 20, 2000 Resource Conservation and Recovery Act (RCRA) Section 7003 Unilateral Administrative Order to the Department of Defense/Department of the Army to Clean up Polychlorinated Biphenyl Contamination in Tanapag Village, Saipan (RCRA 7003 Order). It is prepared for review and comment by the United States Environmental Protection Agency (EPA), Region 9, and is subject to revision pursuant to EPA's comment. It is submitted to meet the revised submittal date of June 1, 2001.

This WP addresses the security measures proposed for both the ongoing site maintenance of the existing contaminated cells and the soil treatment portion of the Phase III Removal Action. Work conducted under this contract will be performed in accordance with all applicable Federal, State, and local laws and regulations.

ECC will provide site security in accordance with the provisions of standard contract specifications. At present, seven-foot high steel mesh fencing with gated access surrounds the perimeter of the existing contaminated soil cell holding area. The thermal desorption unit will be installed within the existing fencing. As part of the ongoing work effort, a local security company has been hired to provide security services at the site. The contract for their services will be extended for the duration of the project. Site security will be maintained 24 hours per day, seven days a week to protect facilities and equipment from unauthorized entry, vandalism, or theft. Security will not be interrupted during holidays or weekends. ECC will maintain a log of all security incidents.

Signs will be posted near all access points providing project information. Signs will be visible from all points where entry might occur and at such distances from restricted areas that employees or visitors may read the signs and take the necessary protective steps before entering.

The Project Manager (PM) will inform all site personnel of the security requirements and ensure that security requirements are strictly maintained.

1.1 Gate Security

Site security personnel will be stationed in a security trailer located adjacent to the access gate to control access to the site. In addition, security personnel will inspect the perimeter fencing, remote office trailers and warning signs on a daily basis. The access gate will be open during normal working hours and locked when there are no on-site activities. Site personnel will be required to display proper identification to site security personnel to gain access to the site.

All personnel entering the site, including site workers, visitors, and deliveries, will be required to log in and out from the site on the Security Log at the security trailer. The security log will include the date, name, address, company, time in and time out for each employee and visitor. If unauthorized personnel are observed on the site, the appropriate law enforcement officials will be notified immediately.

A Visitor's Log will also be maintained at ECC project trailer. Visitors will not be allowed on-site without the knowledge of the Contracting Officer Representative (COR) and the PM. Visitors will not be permitted to enter the exclusion zone, the contaminant reduction zone, and/or other secured areas without the express permission of the Site Safety and Health Officer (SSHO) and the COR. All visitors will be required to complete training in accordance with the Site Safety and Health Plan (SSHP) prior to gaining access to secured areas

1.2 On-Site Communication

Each work crew will have a hand-held radio for communication purposes. In addition, each trailer will be equipped with landline telephones. The PM, Quality Control System Manager (QCSM) and the SSHO also will have pagers so they can be reached during off hours for emergencies and if power is lost at the site. Other personnel will maintain pagers, as determined by the PM, for emergency communications and contingency planning.

The contracted site security services personnel have emergency contact phone numbers of the ECC PM, alternate contact information in case of emergencies, and have been given written instructions in case of extreme weather conditions to advise ECC management of such forecasts.

1.3 Site Security

ECC has erected, and will maintain, a temporary physical barricade to limit access to the exclusion zone and the contaminant reduction zone. Barricades will be securely placed and clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

In addition to the Indirect Thermal Desorption (ITD) equipment located within the perimeter of the existing site, project office trailers will be installed across the road. These offices will be located in an area free of contamination and will allow access to the project management team without having to enter the protected work site. These offices will be staffed as necessary during the off hours and will be patrolled by the security service when they are not occupied.